A METHODOLOGICAL FRAMEWORK FOR INVESTIGATING ALTERNATIVE MODELS OF CATEGORIZATION

By

KUNAL BASU

A DISSERTATION PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

UNIVERSITY OF FLORIDA

1987

Dedicated to the memory of my father

Sunil K. Basu

ACKNOWLEDGEMENTS

I would like to thank a number of people for their contribution to this research. I would especially like to thank Professor Joel B. Cohen for introducing me to the fascinating domain of consumer research and, for his insights and guidance throughout this endeavor. I would also like to thank Professor J. Wesley Hutchinson, Professor William L. Wilkie, and, Professor Ira Horowitz for their advice and suggestions.

I would also like to thank the Centre for Retailing for financial assistance and the Center for Consumer Research (both at the University of Florida) for its laboratory and computational facilities.

Finally, I would like to thank my wife, Susmita, and my daughter Aparajita, for providing me with the support, strength and understanding, without which this project could not have been completed.

TABLE OF CONTENTS

		Page
ACKNOWLEDGEMENTS		iii
ABSTRACT		vi
CHAPTERS		
ONE	INTRODUCTION	1
TWO	LITERATURE REVIEW	7
	Traditional Approaches	8
	Critique of Traditional Approaches	22
	The Categorization Approach: An Emerging Perspective	28
	Models of Categorizations	41
	The Mixed Model: A Contingent Processing Framework	80
	Research Methodologies	108
THREE	HYPOTHESIS	130
	Hypotheses: Exemplar Memorability	135
	Hypotheses: Other Processing Indices	137
	Hypotheses: Contingent Factors	139
FOUR	METHOD AND PRETESTS	143
	Overview	144
	Procedure	148
	Subjects	154
	The Four Studies	154
	Experimental Design	238
	Concluding Comments on Methodology	245

FIVE RESULTS 248

Manipulation Check: Rule Learning by RBG Subjects 249
Overall Summary of Results 251
Study 1: Department Stores 261
Study 2: Vacation Tours 300
Study 3: Alcoholic Beverages 321
Study 4: Residential Houses 340
Summary 359

SIX CONCLUSION 372

Aspects Associated with Verification Performance 376
Aspects Associated with "Other Indices" 381
Aspects Associated with Processing Contingencies 381
Aspects Associated with Stimuli and Procedures 383

APPENDICES

A QUESTIONNAIRE FOR PRETESTS 390

B LIST OF VERIFICATION FEATURES 420

C PROCESSING STYLE QUESTIONNAIRE 426

D FAMILIARITY QUESTIONNAIRE 429

REFERENCES 430

BIOGRAPHICAL SKETCH 446

Abstract of Dissertation Presented to the Graduate School of the University of Florida in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

A METHODOLOGICAL FRAMEWORK FOR INVESTIGATING ALTERNATIVE MODELS OF CATEGORIZATION

By

Kunal Basu

December 1987

Chairman: Joel B. Cohen
Major Department: Marketing

Two fundamentally distinct categorization mechanisms, analytic and nonanalytic, have been described. The former involves comparing features of a target (product/brand) to a summary category representation in memory; the latter is based on overall-similarity comparison between a target and concrete exemplars experienced in the past. This dissertation adopts the perspective that consumers are flexible in employing either, and that choice between them is influenced by individual and judgment context characteristics.

The study of categorization processes is of interest in consumer behavior because an unfamiliar brand might evoke different responses (i.e., evaluation, inferences or choice) depending upon which mechanism is employed. To the extent particular contexts render specific mechanisms more likely, knowledge regarding these might facilitate the design and marketing of new products.

To appreciate the influence of categorization mechanisms, it is necessary to develop an appropriate methodology to identify competing strategies. This is the major focus of the dissertation. Previous studies utilizing artificial stimuli have examined category assignments to discern processing differences. Serious inferential problems have been identified with this approach.

A verification-based methodology was adopted to investigate differences between rule-analytic and exemplar-nonanalytic processes. The central notion here was that the two mechanisms would lead to differences in memory for past exemplars of a category, once a category judgment on a new instance has been made. Exemplar memorability-based measures (i.e., accuracy, latency and confidence in verification judgments), related processing indices and a set of process contingent dimensions were investigated in the study.

Results from four studies indicate that some of the verification indices (accuracy and latency) were moderately

successful in identifying the categorization models. Other processing measures based on categorization performance also demonstrated consistent findings. Category judgments themselves, however, did not afford adequate distinction between the models. Pictorial presentation of category exemplars was found to enhance the likelihood of exemplar-nonanalytic processing while words-only presentations seemed to encourage rule-analytic mechanisms. Operational refinements of the methodology are suggested, providing directions for future research.

CHAPTER ONE

INTRODUCTION

Recent developments in the study of consumer behavior have focussed on issues pertaining to the nature of consumers' mental process in relation to products/brands. These processes are viewed as critical in consumer behavior, since they underlie consumers' interactions with the external world. The general approach of this information processing perspective has been to understand the characteristics of consumers' memory regarding products/brands, as well as the nature of processes that are likely to be adopted by individuals. A number of fundamental questions have been raised, providing significant insights into conceptual as well as applied issues. Two major topics that have received focal attention are those dealing with product perception and product evaluation. The interest has been in understanding how consumers recognize a brand in a store, in advertising, or in other contact environments, and how a brand is evaluated or appraised. Closely associated with the twin issues of product perception and evaluation are other significant aspects of the consumer-product interaction. These include the nature of inferences that consumers are apt to make regarding the product (with respect to attributes and qualities) and the

patterns of choice behavior. While issues such as the above are germane for all products/brands with which a consumer comes into contact, these are especially important when new (i.e., both innovative as well as unfamiliar) products are encountered. A significant part of marketing practice is concerned with designing products and communication programs that are directed towards achieving desired positioning and consumer evaluations of a brand in relation to competing alternatives. Predicting the nature of consumers' mental activities that underlie such perceptions and judgments is hence considered a critical decision element. Developing a robust framework for understanding and predicting product perception and evaluation processes is hence viewed as important by researchers motivated by both conceptual and applied interest in consumer behavior.

Unfortunately, research to date has failed to provide us with such a coherent and integrated picture. By and large, researchers have tended to view the naturally evolving mental activities that involve product perception, evaluation, inference making, etc., in a fragmented manner. While each of these areas has witnessed attempts at conceptualization, less attention has been devoted towards developing a unified conceptual framework. Further, serious paradigmatic differences have left us with a less than satisfying answer to a seemingly fundamental question: What sorts of mental activities occur when consumers encounter an

unfamiliar product/brand, starting with recognition of the same, to the formation of an attitude?

First, for both old and new brands, traditional research in consumer behavior and marketing has tended to view brand perception as an issue separate and apart from brand appraisal. Product positioning research has largely focused on measurement topics pertaining to perceived similarities/differences between brands in a relevant product market, without due consideration of how such mental comparisons are actually made by consumers. In the area of product evaluation, we seem to be snared in a controversy between "purely cognitive" and "purely affective" routes. On the one hand, it is claimed that attitude formation involves certain "analytic" computations using attribute-based rules. Consumers are viewed as reviewing the information regarding a brand (from an advertisement, package, or some other source), evaluating each piece of information separately, followed by some form of integration of the pieces to arrive at an overall decision (e.g., multi-attribute attitude model). Critics, on the other hand, have characterized the above view as "overly cognitive" or mechanistic, arguing that requisite processing resources and/or motivations are often absent for a great many of such judgments and evaluations made almost daily by consumers. Evaluation, it is claimed, might instead be formed through quite different mechanisms, such as in classical conditioning, or "mere exposure" to the attitude object.

As the above indicates, there is considerable uncertainty with respect to the following: how processes that endow a product with an identity (i.e., meaning) are related to those that lead to a particular evaluation of the same and, with respect to the characteristics of the latter itself under different judgment environments. A relatively new development in this area is the perspective that product perception and evaluation are essentially intertwined and arise out of the process of categorizing an unfamiliar object (i.e., product/brand) as being a member of previously experienced products. As Wilkie (1986) indicates, "the way in which we initially categorize a stimulus will affect how interested we will be in it, what we will expect from it, whether we will evaluate it positively or nevatively, and so forth. Thus, there are direct implications for how consumers evaluate products, process ads, and decide what to buy" (p. 393).

It is believed that the categorization perspective that has been gaining prominence in several allied areas (i.e., cognitive psychology, social cognition), and that which will be relied upon in this dissertation, might be useful in providing a conceptual framework to investivate the issues raised earlier. Two major aspects of the framework which are crucial to the problem under study are a) fundamentally distinct mental processes leading to

brand identification and appraisal (i.e., categorization mechanisms) are postulated, involving deliberate and effortful "analytic" processes, as well as spontaneous and potentially "nonanalytic" ones; b) consumers are believed to be flexible in terms of adopting different processing mechanisms, in response to a variety of contextual factors. Adopting such a perspective provides positive heuristic value, in that systematic variations in fundamental processing strategies might now be studied in relation to specific differences in contingent dimensions, along theoretically predicted directions. Critical to the latter, that is, programmatic research to describe consumers' mental activities in relation to unfamiliar products/brands, however, is the development of a methodology that is adequate in terms of identifying the different mechanisms reliably and with validity. Methods currently employed are based on consumers' brand judgment outcomes, and as such are found to be inadequate in discriminating between alternative processing mechanisms. The challenge, then, is to design an overall methodological paradigm that is capable of providing valid discrimination between alternative categorization models, with a view towards complete exploration of the process contingent dimensions.

The objective of this dissertation is to design and test such a methodological paradigm, along with exploration of the

influence of a limited set of contingent dimensions in guiding the adoption of specific categorization mechanisms.

The organization of the dissertation is as follows: Chapter Two examines research perspectives on categorization. Chapter Three presents the research propositions that have guided the study. Experimental procedures and pretests are described in Chapter Four, and Chapter Five reports and discusses the empirical results. The final chapter presents conceptual and methodological limitations of the study and suggests directions for future research.

CHAPTER TWO

LITERATURE REVIEW

Our interest in categorization stems from its unique contribution to our understanding of object identification and the resulting implications of this process for subsequent object evaluation. Accordingly, the first section of this review will focus on describing the traditional approaches to object (i.e., product), perception, and evaluation. This will be followed by a critical assessment, pointing out theoretical as well as methodological weaknesses. Next, the categorization perspective will be introduced, along with discussions regarding the relative advantages associated with the latter. The significant body of literature on categorization will be presented in two parts. The first will concern definitional issues and distinctions between different concepts. In the second section, research dealing with the role of categorization in the context of various information processing activities will be described. Having presented a broad scenario involving categorization, we shall next focus on describing the different models of the categorization process which constitute the central focus of this research. Finally, methodological issues dealing with distinguishing between categorization mechanisms will be discussed, serving as the vantage point for our empirical work.

Traditional Approaches

A significant amount of prior research has investigated the domains of product perception and evaluation, raising a large number of issues and generating an impressive body of knowledge and some lively controversies with respect to both theory and method. Given the focus of this dissertation, i.e., understanding the nature of mental activities involved in the above, some prioritization of the issues is in order. This will take the following form. First, the fundamental tenet of each approach will be presented. Next, emphasis will be directed towards the specific postulate or assumptions that each of these approaches makes with respect to the nature of information processing activities. The latter will be summarized under the section titled "Critiques of Traditional Approaches," in which areas of uncertainty, or deficiencies in knowledge are identified.

Product Perception

In a general sense, the topic of perception is concerned with the nature of translation from the external physical world, to the internal mental world of individuals. While a great many issues are involved in the above, a basic framework for the

latter might be conceived of as including two sets of factors, the first of which pertains to characteristics of the stimulus (i.e., product/brand/ad, etc), and the second to the nature of the processes that are involved in the perception of the latter (Wilkie 1986). The second, i.e., the perceptual processes, constitutes the focus of our current interest.

Researchers in psychology and consumer behavior have generally described perception as an active process of sensing and interpreting stimuli--one that involves intention and attention (Norman 1976; Bettman 1979). The underlying notion appears to be that prior motivational and knowledge states of individuals guide certain selectivity operators that determine which aspects of an environment will receive continued processing. Selection and sensing of physical stimuli, however, are not enough; in order to invest the latter with "meaning," some reference to existing knowledge will be necessary (Glass, Holyoak and Santa 1979). There are significant variations to the above (i.e., those pertaining to "top-down" or "bottom-up" processing), as also with the nature of processing goals and types of attention. While some satisfactory insights are available within the above information processing formulations, a serious limitation for our purposes lies in the inability to trace through such perceptual mechanisms in terms of implications for subsequent mental activities, such as the formation of

evaluation, inference making, etc. In other words, it remains unclear how specifics of processing that endow an object with meaning create conditions for subsequent interactions. A more serious limitation appears to be the lack of proper specification of the types of mental processes involved in the interpretation of sensed stimuli. The mechanisms that concern the necessary comparisons between the target stimulus and information in memory remain inadequately examined.

Despite the somewhat insightful, even if rather fragmentory accounts of perceptual processes, the major thrust of research in consumer behavior and marketing has by and large ignored the nature of mental activities involved in product perception or identification. Product perception is most frequently examined in the context of determining the positioning of a brand in a competitive product market, for purposes of deriving appropriate marketing strategies. Within such a decision-model approach, the emphasis is on developing appropriate methodologies for depicting extant brand positions, without consideration for actual processes that contribute to the same. As described by Glazer (1984), "in the interest of mathematical tractibility, most formal decision-making models (such as conjoint analysis) treat 'perception' as simply an input to formation of preference" (p. 510). These models often view perception as objective, stable and essentially homogeneous across individuals -- with the

possible exception of idiosyncratic stretching and shrinking of axes in a multidimensional spatial representation (Shocker and Srinivasan 1979; Carroll 1972; Pessemier 1980). While a number of methodologies for assessing product positioning have been suggested, most of these involve the following generic steps: a) "relevant product markets" are identified, to which the candidate brand could be viewed as belonging; b) the brands in the above product market are represented abstractly in some space defined by attributes meaningful to both consumers and marketers. Such attributes are viewed as providing the basis for preferences among brands and consumers' perceptions of inter-brand similarities and differences.

A number of criticisms might be levelled at the assumptions involved in the above, with respect to the likely nature of perceptual processes. These include the following: First, how consumers mentally assign a candidate brand to any particular assortment of brands remains unexplained. It is conceivable that a particular brand might be considered a member of different product markets under different contingencies. The decision-model approach ignores preprocessing contingencies and does not provide an avenue to anticipate or predict such variance. Second, the featural representation of markets implies that consumers perceive brands as bundles of distinct attributes and make comparisons on the basis of such. The latter ignores the

possibility that more general, i.e., overall similarity-based relationships, might be employed and underlie the observed configuration. Third, in considering perceptions to be invariant under the observed preference structure, the two judgments, i.e., perception and preference, are assumed to be independent. Such independence appears to belie the notion of evolving mental activities and has been contradicted in past research (Holbrook and Huber 1979; Glazer 1984).

In summary, while some important insights are available regarding perceptual mechanisms, the preponderant use of the decision-model approach in our field has largely neglected the processing activities that lead to the identification of a brand and influence continued interactions with the latter.

Product Evaluation

Before undertaking a review of the relevant research streams, some definitional comments are in order. Consumer researchers have, in general, used the terms brand attitude, affect and evaluation to connote similar notions. Using such labels interchangeably, however, obliterates important conceptual differences with respect to specific psychological states. As Cohen (1987) points out, "there exists a good deal of confusion as to what a particular study is, in fact, manipulating and

measuring, such that potentially important differences between attitude and affect, and more importantly, opportunities for a richer and more complete treatment of the subject are obscured" (p. 1). The distinctions between evaluation and affect have been advanced by several authors. Fiske (1981) suggests that preferences and simple evaluations are distinct from emotions (affect) which are more complex and multidimensional. Similarly, Mandler (1975) distinguishes between evaluative cognitions and affective ones and claims that only the latter are associated with arousal states. D'Astous (1986) adopts a similar distinction in claiming that an evaluative judgment constitutes a statement of goodness made by an individual about an object, which may not be necessarily associated with affect, i.e., emotional arousal like states. Thus, "one can feel that an object is good/bad (affect), know that it is good/bad (concept-evaluation) and say it is good/bad (name)" (p. 143). While conceptually distinct from each other, the relationship between affect or emotion and the relatively "cold" cognitive evaluation states remains an interesting issue and has received some attention in recent research (see Zajonc 1980; Zajonc and Markus 1982; Lazarus 1982; Tsal 1985).

One needs to be precise when constructs such as emotion, attitude or evaluation are employed in the context of any theoretical paradigm. It is the view here (consistent with some

of the positions described above) that evaluative judgments should be considered as cognitive appraisals about specific objects/events, etc., distinct from affect that necessarily includes emotion-like states. Also, similar to our discussion of product perception, the following section will focus specifically on issues pertaining to processing activities involved in product evaluation.

Expectancy-value theory

The general rubric of Expectancy-Value Theory includes the work of several theorists (Atkinson 1957, Tolman 1955, Rosenberg 1956, Fishbein 1963). The basic notion of such a theory is that individuals anticipate and judge the value of the outcomes associated with their acts, and that the strength of their behavioral tendencies is a multiplicative function of these expectancies and values. According to Rosenberg (1956), a leading proponent, "when a person has a relatively stable tendency to respond to a given object with either positive or negative affect, such a tendency is accompanied by a cognitive structure made up of beliefs about potentialities of the object for attaining or blocking the realization of valued states. Thus strong and stable positive affect toward a given object should be associated with beliefs that it leads to the attainment of a

number of important values, while strong negative affect should be associated with beliefs that the object tends to block the attainment of important values" (p. 369). Rosenberg also describes such a stable affect towards an object operationally as "a function of the algebraic sum of the products obtained by multiplying the rated potency of the object for achieving or blocking the realization of that value" (p. 370). While distinctly motivational in orientation, the above formulation shares structural similarities with Fishbein's (1963) learning theory perspective in which an attitude object is seen as associated with various attributes. Such subjective associations are termed beliefs. Each attribute in turn is assumed to elicit an evaluative response, and the overall attitude towards the object is conceived of as the result of the summation of the pairings between each attribute (i.e., the belief) and its corresponding evaluation. Symbolically (Fishbein and Ajzen 1975),

$$A_o = \sum_{i=1}^{n} b_i e_i \qquad (2\text{-}1)$$

where A_o represents the overall attitude towards the object, b_i is the subjective probability of association between the object and the i^{th} attribute, and e_i is the evaluation of the i^{th} attribute.

In terms of their implications for mental processes leading to attitude formation, no explicit formulation is available within either of the above two perspectives. In specifying algebraic rules for the representation of the integration process, however, a clear analytic view is seen as emerging. That is, it is somehow believed that individuals faced with an attitude object begin by selectively attending to certain aspects/features from which psychological values are generated. Such values are then integrated in a piecemeal fashion to arrive at an overall judgment. Importantly, the validation procedures for these models do not focus on the processing assumption, but typically rely on the correlation between the model's predicted score (obtained through measures of the model's components in a sample of respondents) and a direct measure of attitude towards the object.

Empirically, high correlations (as described above) have been reported in several studies using the E-V model framework and in several domains of investigation (Fishbein 1963, Fishbein and Ajzen 1975), but the validity of the model in describing the underlying cognitive mechanisms remains suspect. Indeed, critics (Anderson 1982) have provided evidence that in spite of strong correlations, the adopted evaluation process in a given context may be different from that suggested by the algebraic rule embodied in the E-V model.

The Expectancy-Value framework has received substantial attention among consumer behavior researchers (Hegelson et al. 1984). Several authors (Wilkie and Pessemier 1973, Lutz and Bettman 1977) have offered comprehensive reviews focussing on historical trends and major conceptual issues, as well as on significant findings. In addition, Cohen and Ahtola (1971) have differentiated between two major orientations in the expectancy-value research tradition in consumer behavior (see also d'Astous 1986). The first is primarily guided by managerial considerations, i.e., the necessity of looking at the determinants of consumer behavior for purposes of actionability, and the second, a broader perspective directed at general understanding of antecedents and processes without explicit consideration of managerial decision requirements. Within both of these orientations, several approaches and empirical investigations have been reported. Unfortunately, missing in the above is an explicit consideration of consumers' psychological processes in evaluation formation and an attempt to differentiate between the "true" nature of the processes and their paramorphic representation. In lieu of such knowledge, it appears that consumer researchers have adopted the position that evaluation formation among consumers is essentially an analytic mental process involving cognitive algebra of the type implied by the multiplicative and summation assumptions of the E-V model. So

deepseated is the above, that according to d'Astous (1986), "current research using algebraic models does not focus on the model itself. Rather, the model is utilized as theoretical support for the examination of other marketing phenomenon such as repetition (Mitchell and Olson 1977), deceptive advertising (Olson and Dover 1978) or advertising effects (Mitchell and Olson 1981)" (p. 161).

Within a research orientation guided primarily by a managerial perspective, several "multi-attribute" approaches for product/brand evaluation have been advanced. The goal here is to develop models of consumers' preference structures to provide management with some basis for measurement of why consumers like or dislike specific alternatives, and also to design effective influence strategies to change such evaluations if necessary. As described by Shocker and Srinivasan (1979), "the approaches generally fit within a framework where products or brands are represented abstractly in terms of attributes potentially relevant to consumer choice. Competing brands are indicated by their perceived locations (coordinates or levels) in a product space whose axes are relatable to such attributes. The approaches model customer preferences for (or choices among) these brands in terms of multi-attribute models whose parameters vary for different individuals or market segments under different conditions of intended usage" (p. 171). (Also see Hauser and

Urban 1977; Parker and Srinivasan 1976). A number of models have been proposed by marketing researchers over the years to assess such preference structures of consumers or segments. The multi-attribute attitude model (Wilkie and Pessemier 1973) is a popular example that displays some structural similarities to the E-V models described earlier. The model is defined as follows:

$$A_{jk} = \sum_{i=1}^{n} I_{ik} B_{ijk} \qquad (2\text{-}2)$$

where A_{jk} represents consumer K's attitude towards brand j, I_{ik} is the importance weight given to attribute i by consumer K, and B_{ijk} is consumer K's belief with respect to the extent to which brand j offers attribute i. The above model has been found to possess significant predictive power (Mazis, Ahtola and Klippel 1975). Among other variations of the multi-attribute approach are perceptual mapping and MDS analysis (Stefflre 1971; Green and Carmone 1970; Green and Rao 1972), conjoint analysis (Cattin and Wittink 1976; Green and DeSarbo 1979) and preference regression (Johnson 1971; Pessemier 1975). Here, too, similar to the decision-model approach in perception, links between algebraic models of consumer preference (or choice) and cognitive processes are rarely considered.

Information integration theory

Even though it is not extensively employed as a guiding framework in consumer research on evaluative decision making (for a notable exception, see Bettman, Capon and Lutz 1975a, b), information integration theory has received significant attention in the psychology literature, and many of the assumptions of the algebraic-model approach ingrained in the above have found their way into existing conceptions of consumers' attitude formation towards products/brands. In describing his information integration theory, Anderson (1974, 1981a) claims that evaluation of a person is the result of a summative combination of the evaluative aspects of the traits that describe a person. Specifically, an individual confronted with an array of potential stimuli selectively attends to a subset of aspects (O_1, $O_2 \ldots O_n$), the psychological counterparts of which (S_1, $S_2 \ldots S_n$) are integrated to arrive at an overall evaluation reaction (Ψ), which in turn is reflected as an observable response (R) on a rating-scale instrument. The integration model employed by Anderson, typically is one that is weighted averaging in nature. The weights in the latter are assumed to be independent of context, as well as the scale values.

In spite of the significant success of the model in predicting subjects' responses in the early information integration studies, the latter has been severely critiqued on a

number of dimensions. Critics have suggested that the experimental task itself might have prompted respondents to undertake mental algebra in computing the overall impressions, and that such processes might be less than normal in common evaluation settings. Wyer and Carlston (1979) have also critiqued the assumptions of absence of context effects, independence of weights and scale values and independence of valuation and integration processes as being unrealistic. Cohen, Miniard and Dickson (1980) have called into question the assumption that impression formation in the experimental tasks is a function of the presented information only, claiming that subjects might actively draw inferences during the task, the nature of which, in turn, might be used to explain some of the observed results.

Besides the predictive strength of the weighted-averaging model of information integration, its most significant aspect is its claim of process validity. Anderson (1981b) has claimed that the computations associated with the algebraic-attitude model are intuitive at an unconscious level. That is, in addition to being predictive of attitude formation, the model in fact is a reification of the reality of the cognitive process. Corollaries to the above position, then, are the premises that a) individuals are active information processors, and that b) evaluation of an object occurs only after it has been appraised

completely in congruence with the valuation and integration processes suggested by the algebraic model. That is, it is believed that processes that are employed in encoding the stimulus object, or those directed towards a primal interpretation of the object, do not lead to any evaluative responses, or have any impact on the latter.

Critique of Traditional Approaches

The brief review of the major theoretical and methodological orientations in consumer research on product/brand perception and evaluation reveals both significant depth and willingness to address fundamental questions with respect to the phenomenon. The dynamics of the mental activities, however, has received scant attention in the literature, leaving us at best with certain unvalidated assumptions. We suggest that study of such information processing activities constitutes an important item in research agendas directed towards understanding the nature of consumer behavior as such, as well as that for more specific objectives, i.e., facilitation of effective managerial decision making. While the former is intuitively easier to appreciate, the implications for the latter are profound in terms of designing marketing communications that facilitate consumers' "natural" processing orientations towards the achievement of

desired brand positioning and appraisal. While specific criticisms with respect to the decision-model approach in perception, and both the E-V and algebraic-model paradigms have been discussed previously, the following section discusses the general characteristics of the "analytic" orientation that emerges from the said views. The latter will be contrasted with available knowledge and intuitions regarding various aspects of information processing.

The question that is of paramount interest here is: What happens (psychologically) when an individual encounters an unfamiliar product/brand (i.e., attitude object) till the point when an evaluation of the latter is formed? Evidently, different types of mechanisms are needed to explain selectivity of information acquisition and choice of a mental frame of reference for encoding purposes, as well as some ways of deciding between what is already available versus what might be truly a unique experience. Such a process of stimulus interpretation is undoubtedly complex, drawing on the interplay between information that is available in the context and that stored in memory. Further, as claimed by some (Mandler 1982), such a primitive process of identification ("schema congruence/incongruence") might in itself endow the attitude object with evaluative qualities (e.g., the object is identified as a member of a class of other favored objects). Ongoing mental activities are indeed

possible, potentially involving problem-solving operations, especially when no satisfying match is available. The analytic information aggregation-type models as described earlier seem to consider the integration process itself as the central element leading one to surmise that evaluative responses towards the object are essentially absent till such integration operations are completed. Within such a view, it is difficult to reconcile findings that speak for selectivity biases, problem framing and halo effects with respect to both which aspects/features are considered for integration purposes as well as the choice of relevant psychological referents.

Probably an even more critical "meta assumption" within the analytic processing views is that individuals are active information processors, endowed with sufficient motivational and cognitive resources to undertake specific (algebraic) operations in any environmental context where such evaluative decisions are called forth. A distinction that is of importance here is that between attitude objects with which an individual is unfamiliar, versus those that have been previously encountered, and for which evaluations might be already available in memory. In the latter case, it appears to be inefficient from a functional perspective for the information processing system to embark on a reappraisal process, and a more reasonable alternative could involve a mere retrieval of the relevant evaluation from memory. Such a

retrieval-based notion has found several proponents in the literature. Lingle and Ostrom (1979) asked subjects to evaluate specific individuals in terms of their suitability for given occupations. A given individual was described on a number of characteristics, and subjects' response latencies for the evaluation were recorded. Subjects were then provided with a different occupation and asked whether or not the previously judged individual would be suitable for it. It was found that when the second occupation was similar to the first (in terms of required abilities), subjects' second evaluation judgments were faster than when the two occupations were different. Presumably, for similar occupations, subjects retrieved their initial judgment of the individual without a reassessment based on review of the trait description, while for dissimilar occupations, more deliberate, information-based (and potentially analytic) processes were undertaken. Fiske (1982) has reported evidence for a similar "evaluation transfer" mechanism, guided by schema match-mismatch conditions, in a person evaluation setting. The perspective that appears to emerge from the above studies is that, faced with an evaluation decision, individuals seek to determine the extent of similarity between the target object and other entities encountered in the past, for which mental evaluations are already available. When such similarities are high, then a transfer of evaluation occurs almost automatically,

while mismatches might lead to more elaborate processing. Going back to our distinction between unfamiliar and familiar objects, it thus appears that an essential process contributing to perception and evaluation is an assessment of similarity between what is at hand, and that which might be already known. While, by the above logic, there appears to be little functional benefit in reappraising familiar objects, the reliance on analytic type processes for unfamiliar objects (or schema mismatches) seems far from obvious as well, especially if a number of process contingent dimensions are brought into consideration. In recent years, for example, a lot of attention has been directed towards "low involvement" states (Kassarjian 1978), and it is generally believed that for a majority of situations, and for a large number of product types, consumers are not provoked to direct substantial cognitive facilities towards appraisal or choice activities. The latter, coupled with the view that optimization of product benefits might not necessarily characterize all consumption endeavours, leads one to believe that only particular evaluation contexts might provoke consumers to undertake effortful analytic strategies. Indeed, some researchers (Hirschman and Holbrook 1982) have claimed that the active information processing view of consumers reflects not as much the reality of mental activities, as the overly structured and cognitive view of the existing paradigms. In such a "non-

analytical" view of evaluation and choice, consumers are seen as engaging more frequently in product/brand- related imagery and fantasies, with more emphasis on iconic or visual representations rather than on consideration of abstract product-related attributes. While the latter remains a provocative notion that at the very least seems to square with an intuitive understanding of consumers' day-to-day encounters with a multitude of products/brands (as in television viewing situations, store visits, etc.), the implications of such "experiential," as opposed to cognitive, mechanisms in terms of knowledge storage, activation, usage, etc. are far from evident as of now. Assuredly, investigating whether or not there are fundamentally different evaluation processes, does not require an abandonment of the general view of information processing. A more functional approach would be to tie down processing differences in precise terms with a view toward exploring the contingent dimensions that encourage the adoption of one form over another.

The interest in categorization among cognitive psychologists, as well as those working in social cognition, appears to be promising in exploring the nature of perception and evaluation formation processes, and potentially, fundamental differences (i.e., analytic or nonanalytic) therein. Relating back to the similarity assessment notion (i.e., between target object and information in memory), the focus here is on the

mechanisms for such similarity assessment. Interestingly, in addition to analytical models that are similar structurally to the multi-attribute attitude formulations, intuitive, nonanalytic processes have also been suggested (Brooks 1978; Smith and Medin 1981; Cohen 1982), namely, those that involve "overall similarity" comparisons between the target object and specific exemplars stored in memory.

It is the position here that the study of product/brand perception and evaluation might be conducted fruitfully within the functional perspective of categorization theories, focussing on the different categorization strategies that have been postulated in the literature. The following sections have been devoted towards a review of concepts, theories and empirical investigations in the area.

The Categorization Approach: An Emerging Perspective

> Without concepts, mental life would be chaotic. If we perceive each entity as unique, we would be overwhelmed by the sheer diversity of what we experience and unable to remember more than a minor fraction of what we encounter. And if each individual entity needed a distinct name, our language would be staggeringly complex and communication virtually impossible. Fortunately, though, we do not perceive, remember, and talk about each object and event as unique, but rather as an instance of a class or concept that we already know something about.
>
> (Smith and Medin, 1981, p. 1)

Categorization represents a functional view of information processing. In essence, it postulates that knowledge is organized into at least partially-integrated structures in memory, and that such organized groupings play a critical role in terms of interpretation and evaluation of one's environment, and therefore have significant impact on behavior. A number of fundamental issues, starting from information encoding and selectivity in perception, retrieval phenomena, similarity assessment, causal reasoning, inference mechanisms, to generation of affect, have been addressed within the literature. The functional premise of categorization is that, by treating discernably different stimuli as somehow equivalent, cognitive efficiency is enhanced. There is thus an implicit tradeoff, that between maximizing predictability through formation of a large number of categories with as fine a discrimination between categories as possible, and practicality, which dictates against discrimination, when such is dysfunctional or irrelevant. Although inherently subjective in terms of structural properties as well as their content, it is believed (Garner 1974) that there is a good deal of similarity in our cognitive organization, which mirrors the perceived structure of correlations in our universe. Before examining some specific aspects of the categorization view, and especially the nature of categorization mechanisms which constitutes the focus of the current investigation, a brief

discussion of the scope and contributions of this perspective is in order. The latter will be treated in two parts. The first will examine definitional issues. The second will focus on the interrelationships between categorization and other information processing activities.

Categorization: Definitional Issues

Researchers generally have used the terms "category," "concept," "schema," etc. somehow interchangeably referring to "chunks of knowledge" in memory that provide both meaning to some aspect of our world, as well as have ramifications in terms of learning and change. The need for definitional clarity (Cohen 1979) has led Fiske and Pavelchak (1986) to claim that "it is conceptually useful to keep the terms schema and category separate" (p. 173). A more comprehensive account is available in Hutchinson and Alba (1985) who differentiate between "three fundamental types of knowledge structures--facts, concepts and schemas" (p. 4). Facts are believed to represent the simplest relation that may exist between one or more objects/events, etc. Concepts are defined as "organized collections of facts that constitute the internal representations of objects and events. There are two very general types of concepts that have received the most attention in both the consumer and the psychological

literatures. They are attributes and categories" (p. 10). Finally, schemas are defined similarly as concepts, with the exception that the organization of facts therein may be guided by their relevance to some particular context. Hutchinson and Alba (1985) view the activation of the above knowledge structures in terms of a spreading activations (associative network) view of memory, and claim that all three, i.e., facts, concepts and schemas will probably be activated in most situational contexts. Further distinctions with respect to the nature of mental information have been made with respect to feature attributes and dimensional ones (Smith and Medin 1981), separable and integral attributes (Garner 1974; Tversky and Gati 1982), prestored and computed attributes (Hutchinson and Alba 1985), core attributes and identification procedures (Lingle, Altom and Medin 1984) and episodic and semantic facts (Lingle, Altom and Medin 1984). An interesting addition to the types of categories that an individual may possess, one that is of special interest to consumer researchers, is the notion of ad-hoc or goal-directed catgories (Barsalou 1982, 1983). Such categories are believed to be explicitly functional, i.e., created to achieve certain objectives in a given context/s (e.g., "things not to eat on a diet"), are evaluation laden and are found to possess certain characteristics similar to more descriptive object categories (i.e., birds, furniture, etc.). Keeping in mind the above and

other similar distinctions that have been made in the literature, the perspective adopted in this dissertation views mental categories somewhat generically. That is, if not structurally so, at least from a functional perspective, they are viewed as integrated chunks of information that might be activated as a whole to attend to and provide meaning to the stream of ongoing events and activities. Distinctions between "types" of categories or attributes, then, will be considered depending upon the requirements of specific information processing activities.

Catgorization: Role in Information Processing

Given our discussion of organized knowledge structures, how do such categories influence the nature of information processing? Taylor and Crocker (1981) working in the area of social information processing have characterized the latter as driven by expectations and preconceptions. In other words, hypotheses about how the world works are believed to provide criteria and guidelines that tell the social perceiver what data to look for and how to interpret the data that are found. Hypotheses in the form of activated categories (of persons, traits) lend focus, structure and sequence to search behavior, and subsequently provide a basis for how the information will be used. Cantor and Mischell (1979) list three general classes of

social schemas (categories) that are commonly used by a social perceiver, which also reflect somewhat independent research areas. One is person schemas (Cantor and Mischell 1977) including person impressions, or representations of specific individuals (Hamilton, Katz and Leirer 1980) and self-schemata (Markus 1977). A second is role schemas, which include schemas for particular occupations like fireman, professor, etc.; schemas for social roles like lover or parent; and stereotypic conceptions of social groups like blacks or women. A third type of social schema--"event" schemas--include such things as happenings at cocktail parties or well-practiced behavioral scripts (Schank and Abelson 1977) and stories (Bower, Black and Turner 1979). Besides its obvious interpretive functions, consequences of category assignment are seen as pivotal in the areas of memory-retrieval, object evaluation, inference making and choice. In the following sections, the contribution of the categorization view in each of these areas will be presented. Rather than providing extensive discussions on the above mentioned processing issues, we shall point out only the relevant conceptual and research issues that have been raised.

Categorization and retrieval

It has been suggested that how individuals categorize items, events or people determine which aspects of the latter are

likely to be retrieved more easily on subsequent occasions. Research on occupation-suitability judgments has indicated that people tend to remember attributes that are relevant to categorizing a person better than irrelevant ones both immediately after categorization and following a delay (Ostrom, Lingle, Pryor and Geva 1980). The picture becomes less clear as to subjects' memory for attributes that are congruent and incongruent with those typically associated with a category into which a person has been placed. In some studies, category assignment has been associated with better recall for consistent attributes (Carlston 1980a), while in others, categorization has been found to produce improved recall for category-inconsistent characteristics (Hastie and Kumar 1979).

Categorization and evaluation

The evaluative function of categories has been alluded to earlier. Social schemas (categories) are believed to be normative, in that specific instances can be matched against them for goodness of fit. An implication of this is that, if category relevant expectations are generated prior to encountering any given stimulus configurations, then the latter is judged against this expectation. Recently, Fiske (1982) has provided evidence in favor of "schema-triggered affect." In her experiment, female

subjects rated themselves, their best friend, and a person with whom they have had or were currently experiencing a romantic relationship, on a personality scale. They also rated several photographs of males on a scale measuring the extent to which the latter physically corresponded to their "type of guy." Next, subjects were provided with a photograph and a personality profile of a stimulus person which either matched the subjects' type of guy and/or romantic partner or not, and were asked to make affective judgments. Fiske found that more positive affect was elicited when there was a match, than when there was not, and claims that "when a new person is a good match to one's prior category, the person elicits the affects and actions linked to the schema" (p. 59). The process of formation of social affect and various contingencies therein has started to receive significant attention (Fiske and Pavelchak 1986), with category-based processes contrasted with more piecemeal analytic ones.

In consumer behavior, the notion of category-based affect possesses similarities with affect-referral processes described by Wright (1976a,b), however, no previous experience with the category members is presumed to be necessary. Sujan (1985), drawing on Fiske's (1982) distinction between category-based and piecemeal processes, has attempted to describe consumers' brand evaluation mechanisms in response to match/mismatch of brand information to category expectations. Though similar in spirit

to Mandler's (1982) notion of schema congruence/incongruence (i.e., affect is transferred to the target object from the schema in the event of a match, while a mismatch might provoke, given favourable contingencies, more deliberate processes for purposes of object evaluation), it is difficult to appreciate how, or in what ways, a piecemeal process might transpire without reference to categorical information. Surely, it is difficult to argue that faced with evaluation of an unfamiliar brand, consumers somehow search through all available cognitions in memory in deciding which are appropriate for purposes of interpreting and evaluating the information at hand. To the extent brand information is recognized as having specific meaning that needs to be matched with pre-existing psychological values, some form of memory organization is called forth. Perhaps, what really underlies such piecemeal processing is an analytical categorization mechanism, probably using some probabilistic relationship. Furthermore, the methodology utilized by Sujan draws on the experimentor's interpretation of subjects' protocols on processing activities, which in themselves might not be powerful in providing reliable insights into the true nature of processing mechanisms. As pointed out by Bruner, Goodnow and Austin (1956), categorization is often a "silent" process that might not lend itself to accurate retrospective accounts. Other accounts of category-based evaluation in consumer behavior

include Whitfield and Slatter's (1979) study of furniture preference, where subjects' evaluation of selected items was found to be related to the latters' similarity to prototypes from three classes of furniture styles: modern, Georgian, and art nouveau. Nedungadi and Hutchinson (1985) have shown that consumers' preferences towards brands within a product class are systematically related to an aspect of within-category structure, namely the gradiant of prototypicality.

Categorization and inferences

In the area of inference processes, Lingle, Altom and Medin (1984) have argued that when an attribute inference about an instance is made there are three alternative sources of information upon which it can be based: (a) memory for other attributes of the instance, (b) memory for typical attributes of a category to which the instance has been assigned (i.e., probabilistic attributes), or (c) memory for some other similar instance (i.e., exemplar comparison). A number of studies in social cognition (Allen and Ebbesen 1981; Altom and Lingle 1980; Lingle, Dukerich and Ostrom 1983) have found that subjects rely on category-level information in making inferences, i.e., "filling in" unobservable information, though the variables that presumably determine the choice between mechanisms (b) and (c) seem yet to be fully appreciated.

Categorization and choice

Hutchinson and Alba (1985) have discussed the issue of category-based recall of brands, and its implications for the formation of consumers' evoked sets. They claim that the structure of a product category largely determines the order and latency with which its constitutent brands will be recalled by consumers. Using the example of non-prescription drugs for common cold, they claim that brands that are highly associated tend to be recalled at the same time, and are hence "likely to be included in the same evoked sets and, therefore, will compete more directly with each other than brands that are seldom recalled together" (p. 21).

Categorization and processing contingencies

In addition to issues pertaining to the role of mental categories in different types of processing activities (as described above), research has also looked at the aspect of category accessibility and the role of contingent dimensions that prompt the retrieval of alternative categories in given contexts. Indeed, as pointed out by Bruner (1957), "the likelihood that a sensory input will be categorized in terms of a given category is not only a matter of fit between sensory input and category specifications. It depends also on the accessibility of a

category" (p. 136). Most recent work on natural object categories has focussed on category level as a prime determinant of category use. In her early research on categorization, Rosch and her colleagues (Rosch 1978; Rosch et al. 1976) have defined basic-level categories as those that best capture the correlational structure of attributes and are most efficient in terms of cognitive effort. The efficiency ascribed to the basic level is believed to be due to the fact that they convey more information than both more general as well as more specific levels, and that such basic levels are more distinctive compared to categories at other levels. Basic-level category members are also found to be more similar to each other and highly dissimilar to members from contrasting categories. An impressive body of research has found that the basic-level is the one at which adults and children spontaneously name objects, and that response times to verify labels for basic level categories are significantly shorter than response times to verify lablels for subordinate or superordinate categories (also see Murphy and Smith 1982). It has been claimed (Lingle, Altom and Medin 1984), however, that when categories overlap and are not strictly hierarchical (as is the case for many social and product categories), factors other than level may determine category access. Two factors that have been shown to substantially impact on the probability that a given category will be used to encode

stimulus information are the frequency and recency with which the category has been activated (Srull and Wyer 1979; Wyer and Srull 1981). Relying on a "memory-bin" model, the latter have shown that the probability that a subject will use a particular category to encode information is enhanced by "priming" or activating the catgory in a context separate from the one in which the target stimulus is presented. McGuire and his colleagues (McGuire, McGuire, Child and Fujioka 1978; McGuire, McGuire and Winton 1979) have shown that attribute distinctiveness also affects category accessibility. The final set of factors shown to influence accessibility is the perceivers' concurrent motivational state, personal goals and needs (parallelling mood effects on memory and judgment: Bower 1981; Clark and Isen 1982).

Summary

The picture that emerges from the above discussion of categorization-related issues is that it reflects a mature domain of enquiry. As several excellent reviews (Smith and Medin 1981; Lingle, Altom, and Medin 1984) have pointed out, research in the area has focussed on both structural aspects (i.e., within and between-category relationships) as well as attempts to understand contingencies and outcomes from a processing perspective. The

issue, which seems most significant in terms of understanding the cognitive processes leading to brand perception and evaluation, is the process of category assignment itself. As discussed earlier, the categorization process is believed to involve both interpretive (i.e., perception) as well as evaluation functions--a conceptualization that appears to tackle the encoding and selectivity issues, whose treatment in the traditional analytic view seemed somewhat dubious. In addition, within the above paradigm, several alternative models (i.e., classification strategies) have been proposed, each involving its own representational and processing assumptions. The latter, often alternative processing views, if considered in tandem within a functional perspective, would seem to provide us with some flexibility in terms of conceiving divergent processing phenomena. Research might then be addressed towards determining which of these processing varieties is more or less probable given the various contexts of consumers' evaluative decision making. The following section reviews alternative categorization models that have been discussed in the literature.

Models of Categorization

As described by Cohen and Basu (1987), "categorization in essence, involves comparison between a target and categorical

knowledge" (p. 456). A number of fundamental information processing issues are germane to such a comparison process. Relying on the familiar "structure" and "function" issues, both the content and form of memory representation of the referent information, as well as the mechanics of the comparison process, are likely to be important. A number of typologies have been suggested in the literature. Alba and Hutchinson (1985) have suggested three bases for distinguishing between categorization models: analytic versus nonanalytic, conscious versus deliberate, and prototype versus exemplar, and claimed that each one of these aspects could occur in combination with others, and that such combinations would constitute unique models of categorization. Cohen and Basu (1987) have also suggested a typology based on similar distinctions. Our matrix arrangement (Table 2-1) describes the nature of distinct categorization models based on combinations of representational, processing, and degree of automaticity assumptions. We claim that while such a typology does not reflect equally developed or well understood mechanisms, it is useful "both for comparing alternative models and to pinpoint key (and often unstated) assumptions and unresolved conceptual issues for each" (p. 456). The above typology will be adopted in this dissertation to explicate the most frequently advanced models, often discussed as the "classical," "prototype" and "exemplar" views of categorization.

Table 2-1

A Typology of Categorization Models

		Category Representation		
		Rule defined	Prototype defined[a]	Exemplar defined
Analytic Comparison Processes	Automatic Mechanisms	Preconscious dimensional analysis of target (e.g., brightness, shape, location for visual inputs) instigates serial comparisons to hierarchically organized memory representations until a satisfactory match is found. Illustrated in models of stimulus detection/identification and word recognition. Not treated explicitly in models of categorization. (1)	Target compared to either a probabilistic rule or an ideal category member possibly via automatic (and exhaustive) retrieval of features associated to some degree with a category. The larger the number of "successful" comparisons, the closer the target is to the centroid of the category. Possible mechanisms are insufficiently explored. (2)	Category represented by a number of "good" examples. These are specific concrete instances. Comparison to a target is carried out on a feature-to-feature basis following initial retrieval of "plausible" or available exemplars as in (1). Mechanisms tailored to such a multi-stage process have not been specified. (3)
	Deliberative Mechanisms	Emphasis on more conscious and top-down mechanisms. Key features of target singled out for explicit comparison against a category-defining feature-based rule (which itself may be abstracted from prior learning experiences). Illustrated by much of the work described under the "classical view". (4)	Same as (2) except mechanism is more similar to hypothesis testing wherein either a prescribed number of critical features tests must be confirmed or the matches must be "sufficiently close" on a requisite number of features to establish family resemblance. (5)	Exemplar retrieval probably guided by top-down or contextual factors. Closeness of match is determined by individual features tests based most likely on some combination of number of feature matches. Once exemplar(s) is (are) identified, idiosyncratic features may play an important role in all exemplar comparisons. (6)
Nonanalytic Comparison Processes	Automatic Mechanisms	Same as (1) except configural or template representation of target and feature-based rule are compared directly using some overall "automatic" response to similarity/dissimilarity (possibly activation level following an unsuccessful comparison). No clearly specified model is available for this cell. (7)	Though both representational versions of a prototype model are possible, a more "holistic" comparison to some hypothetical "ideal" category member is suggested. The mechanism is unspecified, possibly similar to (7) wherein a significant departure from a "good fit" leads to continued memory search. (8)	Preconscious processing of target feature-level information produces an overall representation that is compared directly against an overall representation of an exemplar. Significant dissimilarity/incongruity leads to search for better fitting exemplars. No well-specified model exists for this cell. (9)
	Deliberative Mechanisms	Same as (4) except a configural or template representation of target and feature-based rule are compared directly, and criterion centers on degree of overall fit (e.g., pattern matching). No clearly specified model is available for this cell. (10)	Differs from (8) in that a more "top down" comparison process is suggested. The criterion, therefore, may be similar to a "nearest neighbor" rule proceeding from the most "plausible" or available category. Nonfeature-based comparisons are not well specified and may be difficult to distinguish from well-learned and rapid feature-based automatic mechanisms. (11)	Similar to (11) except that the matching process and criterion, center on some direct determination of degree of overall similarity to one or several exemplars. Configural properties (at a minimum, correlations among features) are possible as a basis for comparison; however, no more global model has been clearly specified. (12)

[a] Two somewhat different representations of a prototype have been discussed in the literature: (1) a category defining rule specified in terms of characteristic features of a prototypical category member (permitting probabilistic rather than "all or nothing" appraisal of a target), and (2) some overall representation of hypothetical "ideal" category member (possessing the average value of the category on all relevant features).

Source: Cohen and Basu (1987)

Before undertaking the latter, a few comments on the level of analysis are in order.

A key issue with respect to the distinction between categorization models involves the analytic versus nonanalytic distinctions. The first of these, the analytic process, is presumed to build up, piecemeal, from individual features, while the latter is somehow viewed as functioning on "holistic" or overall similarity notions. Alternative views of the nonanalytic process are available and will be discussed in following sections. The issue here is sometimes seen as a contradiction between "Gestalt" and "minimalist" views, parallelling that in early research on perception. The issue of decomposability has in fact been the focus of a debate between the structuralists who saw all experience as built out of primitive meaningless sensations, and the Gestaltists, who emphasized irrudicible emergent properties of wholes (see Boring 1950; Mervis and Rosch 1981). Modern-day cognitive scientists seem to be in agreement that processes evoked during initial stages of perception are computational in nature (Glass, Holyoak and Santa 1979; Smith and Kemler Nelson 1984), and that such processes occur certainly, outside of awareness. Once such automatic feature "read-in" has occurred, more unified representations are likely (Dreyfus 1979). Thus, as pointed out by Mervis and Rosch (1981), while some decomposition is involved, particularly at the level of sensory

input, "it is never to the point of infinite regress" (p. 92). It is the position here that rather than addressing the analytic versus nonanalytic process issue, at the stage of primitive preperceptual processes, it is functionally more appropriate to consider such a distinction for ongoing categorization activities, once a unified representation of the stimulus has been formed. The level at which categorization models are appraised in the following sections, then, is based on the notion that primitive sensory perception of stimulus objects has already been accomplished, and ongoing categorization mechanisms might rely on available elemental as well as entity-level representations.

The Classical View

The perspective titled the "classical" view represents a historic tradition of structuralistic perspective in various domains of enquiry. In attempting to explain human response to unfamiliar objects/persons, etc. and providing a systematic basis for predicting the "response generalization" patterns reported by learning theorists, researchers primarily in linguistics (Lyons 1978; Miller and Johnson-Laird 1976; Anglin 1977) and psychology (Bruner, Goodnow and Austin 1956; Dominowski 1974) emphasized formalization of information in memory. Such formal structures

were believed to arise from a concept acquisition principle that was endowed with explicitly functional objectives: maximization of information acquisition; minimization of errors, as well as minimization of cognitive strain. No distinction was offered between the nature of the concept acquisition principle and the resulting structure of mental information, so that what might have been initially a functional processing assumption has come to be accepted as signifying structural characteristics of the acquired categories of information as well. Typically, the classical theory has viewed the concept acquisition process as a search for necessary and sufficient attributes that jointly determine category membership. That is, an entity that possesses the entire set of critical features is assigned category membership, while lack of even one of the said features constitutes grounds for rejection. Thus, drawing an example from Cohen and Basu (1987), "if an individual's concept of an economy car were to include a defining attribute, 'cramped seating space' and he/she should ever encounter a single economy car with ample leg room, the classical position requires either his/her concept to change, since 'cramped seating space' would no longer be true of all category members, or assigning this car to a different (maybe new) category, e.g., 'comfortable economy cars'" (p. 458). A corrollary to such a principle is that all catgory members should be equivalent (i.e., equally representative). A number of

influential studies have recently challenged the strict assumption of the classical view. Primarily, researchers have shown that rather than treating all members of a category as equivalent, experimental subjects demonstrate a "graded structure." Rips, Shoben and Smith (1973) and Rosch (1973) have shown that items judged to be typical members of a concept can be categorized more efficiently than items judged to be less typical. For example, when the overall category of birds is considered, robin and sparrow (test instances) are categorized faster than eagle and hawk. Also, error rates associated with such categorizations are found to decrease with increasing typicality of an item. Mervis, Catlin and Rosch (1976) found that typical category members are also likely to be named first, the latter are the first ones in the category learned by children (Rosch 1973) and often serve as cognitive reference points compared to atypical members (Rosch 1975). In addition to the above, criticisms of the classical view also flow from the finding that besides the necessary attributes, subjects also elicit non-necessary features, i.e., those idiosyncratic to specific exemplars, in response to tasks that call for attribute listings relevant to specific catgories (Hampton 1979). Finally, notwithstanding the above empirical findings, even conceptually it becomes close to impossible to construct categories with a clear set of defining features, largely because in reality there

are few categories with clear-cut boundaries to justify an exclusiveness of properties for all its members. A different line of attack (one that is guided by the processing assumption of the model) could be construed in terms of the overly analytical view of the mechanism. While the classification process has not received separate attention within the classical view, the acquisition principle seems to suggest that the mechanism is best described by the Rule-Analytic cell of Table 2-1. Day-to-day experience with object classification seems to belie such an overtly analytic process with its necessary requirments of attention, cognitive effort and motivational commitment.

Smith and Medin (1981) have attempted to "salvage" the classical view by invoking the distinction between core attributes and identification procedures. They suggest that the classical definition of categories (i.e., with respect to necessary and sufficient attributes) might be related to the core meaning of the concept than the process of identification of stimuli, which might rely on principles that are far less rigid, and potentially take into consideration the variability of members based on characteristic attributes. Thus, semantic categorization tasks would seem to hold more promise in validating the classical definition of the core than would perceptual tasks (as are routinely employed). They also state

that besides the scarcity of research, there seems to be marked similarities in comparing between the two. In any event, even if the classical model stands vindicated in its description of the core meaning of a concept (possibly for relatively easily definable and unambiguous ones), its validity in describing the classification procedure seems to be seriously in doubt.

The Prototype/Probabilistic View

While it is difficult to historically trace the genesis of the prototype/probabilistic views, their popularity in the literature seems to be partially due to their perceived success in dealing with the limitations of the classical model in specifying a concept acquisition process that is sensitive in accounting for within-category variability. The various prototype views seem to share a penchant for some form of abstraction in relation to knowledge acquisition. Beyond such general similarities, the rubric encompases divergent models, premised on varied representational and processing assumptions. An early study that was successful in attracting a number of adherents to the notion of a prototype, was reported by Posner and Keele (1968). Their guiding hypothesis was that learning to categorize instances involves constructing representations of the prototype, that is, forming a representation made up of the

average values of all relevant dimensions. Experimentally, subjects were provided with instances of dot patterns from two catgories and trained to make appropriate classifications. After training, there were test trials in which subjects had to categorize the learned instances, new instances of the concepts, and the prototypes of the two concepts. Two significant findings emerged: First, on test trials given soon after training, subjects categorized the prototype patterns (which they had never seen before) as quickly and accurately as the training instances. Second, when there was a delay between training and test, there was more forgetting for the learned instances than for the prototypes. Homa and Vosburgh (1976), among others, have interpreted the above in both representational and processing terms. That is, it is believed that through interaction with a number of category instances, observers extract a "central tendency," that is then represented in memory as a hypothetical entity. The latter, i.e., the prototype, is composed of average values as described above, on a set of relevant dimensions, but without any individuating information, as are associated with the specific instances. Such a prototype is evoked during categorization and a "distance-type" matrix computed with respect to the target to determine categorization outcome. This then is similar to cell 5 of Table 2-1, in that, the "hypothesis-testing" approach endows it with deliberative as opposed to automatic

processing qualities. In an extensive rsearch program, Homa (1984) has described a range of category learning conditions that facilitate prototype formation in memory.

Other accounts of prototypes are more ambiguous with respect to basic information processing assumptions. Within what they characterize as "the Probabilistic View: Featural Approach," Smith and Medin (1981) have described a prototype-based categorization process as follows: "An entity X is categorized as an instance or subset of concept Y, only if X possesses some critical sum of the weighted features of Y." The latter implies that people are sensitive to, and make use of, many more features than would be expected on the basis of the classical view, features that are only generally true of a concept's instances in determining category membership. Thus, the search for necessary and sufficient features is de-emphasized. Rather, a measure of "goodness of membership" is sought. A fairly large number of authors have adopted a similar probabilistic rule-based (and hence analytic) view of the categorization process, without, however, attempting to specify the memory representation of the prototype beyond such a computational principle or rule. Rosch and Mervis (1975), for example, have developed a cue-validity model based on the extent of featural overlap between a target and contrasting categories. In their formulation, the probability that an object is a member

of a particular category, given that it has a particular property, i.e., its cue validity is represented as

$$\text{Cue Validity} = \text{prob (category j/cue i)}$$

$$= \frac{\text{prob (category j} \cap \text{cue i)}}{\text{prob (category k} \cap \text{cue i)}}$$

Using categories of artificial material, they have shown that the greater the featural overlap with a contrast category, the longer it took for subjects to categorize the test item; also, the more likely was the chance of categorizing it incorrectly, and the less typical it was rated of its appropriate category. Mervis and Rosch (1981) claim that abstraction is essential in all models of categorization. The latter, according to them, involves "determining which elements of a situation are 'essential' and which irrelevant; and the creation of new higher order information which was not given in any particular exemplar. The type of novel higher order information generated varies for different models" (p. 101). Even though memory for specific instances is not precluded, the representational form of the abstracted information remains unspecified. Smith, Shoben and Rips (1974) have suggested a variation of the above model, relying on a type of spreading activation model of memory. Here, categories are viewed as summary descriptions containing non-necessary features in addition to necessary ones, with each

feature weighted by its importance in conferring category membership. Emphasizing the processing aspects, activation is seen as spreading from a test item and an evoked concept, and a successful intersection of such activation is seen as instrumental in category assignment. The role of non-necessary (or unweighted) features is also emphasized by Smith, Shoben and Rips (1974), who propose a two-stage process in which failure to obtain a satisfactory match in the first stage (involving all available features) is seen as prompting a more focussed assessment in which essential features dominate the comparison. Here, similar to previous accounts, the analytic, computational assumption of the process is apparent. In calling forth the influence of non-necessary features, however, the nature of a prototype representation is further complicated. Not only is the perceived economy of the abstracted information (as claimed by previous accounts) jeopardized, but representations that are more embellished in some ways than a threadbare probabilistic rule might be envisaged. "Hypothesis-testing" in orientation (see Alba and Hutchinson 1985), the above models seem likely candidates for cells 4 and 5 of Table 2-1, even though their representational assumptions are unclear at best.

Recently, significant interest in categorization theories has been manifested by researchers in the social cognition area. Although careful in delineating differences between social

categories and those for natural objects (see Holyoak and Gordon 1984; Lingle, Altom and Medin 1984), such theories are intended to be useful in describing how individuals interpret and evaluate objects, events, interpersonal communications, etc. The prototype construct has been adopted here as well, reflecting both the ambiguities encountered in the object classification literature and some departures in terms of processing assumptions. Cantor (1982), for example, claims that the prototype model is more useful than the classical view in describing one's response to the variety of possible subsets of features encountered in the social domain. The process of assessing similarity between a target event and prior experience is seen as a probabilistic process based on the degree of overlap in features between the former and the prototypes from rival categories. There is, as in earlier research, little attention towards the nature of representation of the prototype itself. Other authors (Cantor and Mischel 1979) have drawn on the family resemblance notion from Rosch and Mervis (1975) and advanced a somewhat different (although incompletely specified) and less analytic view of classification, "it is probably the degree of family resemblance, not the continuous surpassing of a few critical properties tests, that determines category membership in everyday person perceptions" (p. 11). A key assumption in Wyer and Srull's (1981) memory-bin model (for purposes of

investigating determinants of category accessibility) is that similar to functioning of schemas (Bartlett 1932), once information is encoded, details of the original instances will be forgotten, with the result that such encoding will serve primarily as a basis for subsequent judgments of persons, objects, and events. They claim that "although the original information as well as the encoding of it may initially have some effect on these judgments, the relative influence of the encoding will increase over time" (p. 175). In discussions on the "Encoder/Organizer" unit of their processing model, they claim that an instance might also be categorized on the basis of a comparison of the configuration of its features with configurations contained in additional bins, without prior encoding of the individual features comprising the configuration. Even though both Cantor and Mischell (1979) and Wyer and Srull (1981) seem to favor at least some abstraction of information (from specific instances) at encoding, their views of the prototype model appear to be different from others on two key aspects: (a) in recognizing the role of non-necessary features as referents of the comparison process they appear to view the prototype representation, not as an ideal or hypothetical entity (e.g., in Posner and Keele, 1968) or a mere computational rule, but probably endowed with "instance-like" qualities, and (b) in postulating a "general similarity-based" comparison in which

entire configurations are compared, more configural and somewhat nonanalytic (rather than computational) process are evoked. Absence of detailed treatment of the models on these specific dimensions, at best renders them likely candidates for cell 10 of Table 2-1.

As described by Alba and Hutchinson (1985), a major alternative to the deliberate and "hypothesis-testing" type prototype models discussed earlier is the feature-frequency models (Hayes-Roth and Hayes-Roth 1975; Kellog 1980; Neuman 1974). The central premise of these models is that as an individual encounters various members of a category, the relative frequencies of attributes contained in these members are updated on a continuing basis in his/her memory. Such ongoing (and obviously automatic as opposed to conscious) feature counting leaves the individual with a set of attributes for an entire product class, some of which are more salient as a function of more frequent encounters. It is believed that such salient attributes are then matched with their counterparts during categorization of a novel item, through similar unconscious processes. This, then, clearly qualifies as a member of the "Analytic-Automatic" cells of Table 2-1, although the nature of the prototype representation again remains shrouded due to the lack of specificity. Alba and Hutchinson (1985) have drawn a nice connection between the automatic feature-frequency mechanism

and low-involvement learning processes as described by Krugman (1965). In their view, consistent with the "perceptual shifts" that were postulated as resulting from exposure to television advertising, increasing the frequency of an attribute (through repetition of an ad focusing on the same) might increase the likelihood that such an attribute will become salient enough to be evoked and employed as a reference point during future brand classifications.

Despite the significant body of research that the prototype/probabilistic perspective has generated, it has received its fair share of critiques as well. Criticisms have been targeted on a number of issues, with significant emphasis on category modification, context effects, and biases induced through "similar" concrete instances. Addressing the issue of category modification, Cohen and Basu (1987) argue, "if an abstracted representation has been formed, it is not clear how the new information is to be combined with it (e.g., some complex type of weighting scheme) depending on various characteristics of the already existing prototype" (p. 460). How should one for example treat instances perceived as being outliers, even though some level of membership criteriality has been satisfied? Short of creation of a possible subcategory (with associated prototypes), is there some way of representing such knowledge in existing abstractions? In a related issue, as Smith and Medin

(1981) have noted, beyond the list of features that might describe a prototype, people also have additional category-related information, such as the relationships between features and the variability that is permissible on any feature. With respect to the first, i.e., the correlations between features, Medin et al. (1982) have claimed that most of the complex entities we encounter might not be representable by different combinations of a basic set of orthogonal attributes. Working with classification of patients in a medical diagnosis context, they have shown that individuals are often sensitive to, pay attention and use knowledge about feature correlations in making judgments. Neumann (1974) has also shown that individuals demonstrate sensitivity to correlations and perform categorization judgments more efficiently when such information is readily available. Within the various prototype models, mechanisms to deal with such "additional" information are unavailable, both from the point of view of summary representations as well as processing. Smith and Medin (1981) have suggested some accommodation using the notions of "conjuctive features" and "labelled relations," although more complex and hitherto untested "network type" relations between features need to be evoked for the purpose. A second issue has to do with judgments of variability. Walker (1975) has shown that in addition to knowledge regarding typical attributes,

people also have available, information on the extent of possible variance on these and seem to use this in classification judgments. In other words, both feature correlations and variability knowledge call into question the notion that category knowledge consists exclusively of critical features or probabilistic values associated with a set of attributes. It appears that richer and more complex information regarding categories might be available and used than that suggested by a general prototype-based formulation.

Another area where the prototype view has run into criticism is with respect to context effects on classification judgments. A robust finding in the memory literature is that access to stored information depends on available retrieval cues provided by a context (Tulving and Thomson 1973). There is now evidence that outcomes of classification judgments are also sensitive to the presence of specific retrieval cues that are afforded by a given context. Roth (1980) has shown that category instance typicality judgments are influenced by sentential contexts. Cantor, Mischell and Schwartz (1982) have found that the judgment of personality types depends on the situational contexts in which behavior occurs. Systematic biasing effects in categorization are also found when memory is primed through the presentation of instances from rival categories. That is, there is a propensity to categorize somewhat ambiguous target items

consistent with "similar" concrete instances experienced in the past, when the latter are used as primes prior to the judgment (Tversky and Kahneman 1973; Medin and Schaffer 1978). Similar to the biasing effect of memorable instances are effects of exemplar density. The effect of the number of exemplars that a given context is able to cue has been found to systematically influence classification judgments (Medin and Smith 1981). The prototype/probabilistic models have difficulty in dealing with the broad range of context effects that empirical studies have demonstrated. Largely, this is so because these models need to assume that people have different categories for each potential context, or that they somehow differentially weight component attributes in different contexts (Lingle, Altom and Medin 1984). The first assumption is "uneconomical" and the second is time-consuming and a drain on mental resources.

A different point of criticism levelled at the prototype view draws from what has come to be known as the "linear separability" paradigm (Medin and Schwanenflugel 1981). Categories are viewed as linearly separable if they can be perfectly partitioned (from contrasting categories) on the basis of a weighted additive combination of component information. Prototype theories would predict that linearly separable categories should be easier to learn than those in which such a linear discriminant function (with respect to critical

dimensions) is unavailable. The above authors report, however, that in a number of experiments that varied stimulus type, category size and instructions, there was no evidence for facilitation of learning in the cases where categories were characterized by linear separability. Smith and Kemler-Nelson (1984) have also reported similar findings.

Thus, while there appears to be some support for the use of summary representations (i.e., prototypes) and their "analytic" use in information processing, the associated models are (a) incompletely specified in terms of the fundamental distinctions described earlier, i.e., with respect to the nature of prototype representation and matching mechanisms; and (b) at least incomplete, in terms of describing the gamut of information processing activities, as highlighted by the aforementioned criticisms. In consumer behavior, there seems to be some intuitive basis for expecting that abstract featural rules (i.e., those unrelated to any specific product/brand) involving product categories might be utilized by consumers in making classifications. For example, in attempting to decide whether or not to patronize a particular restaurant, a consumer might first evoke specific attributes that describe his/her preferences for the category (e.g., must have at least three of the following four attributes: serve French or Italian cuisine; not too crowded; soft-focus lighting; live performances of classical

music), and second, go about an analytic procedure matching the relevant prototypical attributes with those of the target, in arriving at a decision (i.e., "This is/is not one of my preferred types of restaurants"). Further, such a prototype-based categorization strategy might be speculated to be more or less likely, depending upon a number of contingent dimensions related to characteristics of the individual, the target, as well as aspects of the judgment context. However, other categorization scenarios might be envisioned as well, in which the profile of these contingencies might provoke the individual to adopt significantly different strategies with respect to both the type of memory representation that is accessed, and/or the processing mechanisms that are called forth. The following section reviews categorization models that are based on such alternative formulations.

The Exemplar View

The "exemplar" perspective in categorization draws its lineage from diverse research streams. Initially investigated in the perceptual identification and concept acquisition literatures, such notions have also manifested recently in the domain of child development and causal reasoning, as well as in social information processing. In the exemplar view, target instances are categorized by cueing the retrieval of specific

category exemplars. The more similar the target instance is to concrete exemplars of a category, the more likely it will be placed in that category. According to such a view, the salience or accessibility of specific exemplars (that have been categorized previously) at the time of judgment, exerts critical influence in terms of category placement. Thus, factors that influence exemplar retrieval are paramount in determining classification outcomes. The latter might include frequency and recency of activation, distinctiveness, concurrent goals, as well as characteristics of the environment in which the target stimulus is encountered. The potential use of exemplars during categorization has been viewed as beneficial in terms of bypassing some of the problematic aspects of the prototype models. For example, to the extent different contexts might cue the retrieval of different exemplars, the same target object might be classified differently. Thus, it is no longer necessary to postulate large numbers of categories, appropriate for each context of encounter, but simply that a given category might contain several exemplars, some of which are more likely to be retrieved in a given context than others. Existence of concrete category-level exemplars might also be seen as relaxing the information constraints implied by summary representations. Correlations between features, as well as variability judgments might now be determined on an "on line" basis (Smith and Medin

1981), also, non-necessary or idiosyncratic aspects of category members might be available and influence the comparison process, and, in turn, judgment outcomes themselves.

Despite the attractiveness of the above perspective, its usefulness depends upon careful specification of these models in terms of fundamental information processing characteristics. In terms of memory representation, the exemplar view might be seen as differing from the others in a "quasi-representational sense; namely, that it assumes that a molar representation of specific category members is brought to mind (regardless of how such information in fact may be stored in memory)" (Cohen and Basu 1987, p. 460). Even though the exact form or code of exemplar representation has rarely been discussed in the literature (for an exception, see Cohen 1982), the closest parallel appears to lie in accounts of imagery, and its role in mental processes. Kosslyn (1976) has reported several studies that show that under certain instructional studies, subjects tend to "mentally picture" objects in responding to verification tasks, rather than relying on propositional information. For example, when subjects learned to draw the map of a mythical island and were asked to imagine it, the time taken to locate a given place on the map in a separate judgment increased with distance from the focal point. This, however, was not observed when subjects performed the location judgment without first imaging it. Findings such as in

the above led Cohen (1982) to note that imaged representations are not only experienced, but actually play a major role in information processing and judgment. Claiming that it might not be possible to conclusively demonstrate whether a particular representation (e.g., of an entity) is propositional or analog, one might assume at the very least coexistence of analog and propositional forms and proceed to address the functional role of mental images in categorization. Other perspectives that might be brought to bear on the nature of the exemplar representation include research on episodic memory and that on perceptual comparisons (see Glass, Holyoak and Santa 1979).

Referring to our distinction between analytic and nonanalytic processes, two distinct types of exemplar models might be envisioned. The first involves an aspect-by-aspect matching process between the target and a retrieved exemplar. Such a version differs from the prototype views in that the referrent of the comparison process is different -- i.e., the target is matched against a stored or constructed probabilistic rule of hypothetical category prototype, versus salient "good instances" of the category. This, then, would belong in cell 6 of Table 2-1. As described by Cohen and Basu (1987), "a second comparison process is more holistic. Its premise is that 'psychological meaning' exists at the level of the entity, regardless of whether more elemental (feature level) information

is also stored in memory. The rapid assembly of feature-level information into a more integral representation of a stimulus may also imply that access to entity-level representations is more immediate than access to feature-level information. This suggests that nonanaltic overall similarity comparisons may indeed be primary, with attribute-based analytic processes 'available' when necessary to meet task requirements" (p. 460) (also see cell 12 of Table 2-1).

Some of the earlier studies adopting the exemplar perspective questioned the interpretation of empirical findings that had used the prototype model to explain the performance of subjects in a standard category-judgment paradigm. Medin and Schaffer (1978), for example, sought to explain the Posner and Keele (1968) findings (described earlier), using a multiplicative model based on exemplar information. In trying to explain why performance on prototype patterns frequently equals or exceeds performance on old training patterns, they claim that

> the result can be predicted by the context model because the prototypic pattern almost always is the pattern having the greatest number of highly similar category exemplars or training patterns. Not only that but also the ways in which categories have usually been constructed (Reed 1972), the prototype is unlikely to be highly similar to any exemplars from alternative categories. . . . whether performance on new prototype patterns is better or worse than performance on old training patterns will depend on the component similarity parameters according to

> the context theory. If similarity is low, few between-category confusions will occur, and training pattern performance will be excellent; if similarity is higher, more between-category confusions will occur, and this will hinder performance on training patterns because prototype patterns are unlikely to be similar to (confusable with) alternativecategory exemplars."
>
> (Medin and Schaffer, 1978, p. 221).

The cue-context model proposes that a probe stimulus functions as a retrieval cue to access information stored with stimuli similar to the probe. While it assumes that category-level summary information does not influence judgments, it does not claim that such information does not exist. It is claimed that various cue dimensions comprising the target are combined in an interactive (multiplicative) manner to determine the overall similarity between an exemplar and the target object. The multiplicative rule has the potential to represent necessary features without committing itself to a singly necessary and jointly sufficient features framework.

In a different model building effort, Hintzman and Ludlum (1980) were able to simulate the differential forgetting observed in Posner and Keele's (1968) experiments, with a computer model MINERVA, that used category exemplars as the sole basis for generalization. Here, forgetting of stimulus properties occurred in an all-or-nothing fashion, and only a single exemplar was retrieved from each category at the time of transfer. Homa,

Sterling and Trepel (1981) have critiqued the above two models on a number of procedural issues: (a) the categories employed in the above did not satisfy the criteria for "ill-defined categories;" (b) subjects in the experiments had minimal experience with exemplars during category learning; and (c) learning variables known to shape generalization gradients were not manipulated. Homa et al. (1981) have also argued that exemplar-based generalizations might be effective only under conditions of minimal category experience, and/or when the judgment task immediately follows concept acquisition. Prototype abstraction is believed to occur with continued experience, and guide classifications.

The cue-context model and its like were instrumental in setting forth the notion that classification judgment outcomes were not uniquely predictable on the basis of some prototype-based theory and that potentially more complex mechanisms could be operative. If anything, they served to expose the category acquisition and judgment methodology ubiquitous in the literature, as somewhat lacking in identifying between alternative processing routes. (A more detailed discussion of this aspect is reserved till future sections.) No definite conceptualization of what may constitute a nonanalytic process, as opposed to the algebraic functions involved in the prototype models, was also available.

Brooks (1978) has reported what is probably the most convincing evidence for the use of an exemplar matching strategy for acquisition of complex concepts. In his experiments, subjects learned to pair structured letter strings generated from two Markov grammars with the names of cities and animals in a paired associate task. The two types of labels were not correlated with the grammatical membership of the letter strings. Also, subjects were unaware that the letter strings could be classified into two categories. Subjects were next presented with new letter strings and asked to classify them into three categories (i.e., the two grammar-generated letter strings and those belonging to neither category). Brooks found that subjects performed the task with 60 to 65% accuracy but apparently without being able to specify the category rules and defining attributes. Brooks concluded that subjects had learned the basis of categorization through memorization of the exemplars and matching new instances to these. Jacoby and Brooks (1984) have relied on evidence to offer a distinction between analytic and nonanalytic generalization. In their view,

> the traditional cognitive approach to generalization relies on isolating, across many episodes, the features that individually help to predict a higher level unit, such as a grapheme, word, logogen, prototype, or semantic unit. Since this type of generalization requires breaking the original stimulus into stable relevant and irrelevant features, we shall refer to it as analytic generalization.
>
> (Jacoby and Brooks, 1984, p. 2).

The authors claim that instead of relying solely on the analytic generalization of recombinable units, generality could come from treating similar situations analogously. Thus "a dog could be identified by reference to a similar already-known animal rather than by reference to a general prototype of the species" (Jacoby and Brooks, 1984, p. 3). Arguing against the distinction often made in the literature between perceptual identification and conceptual judgments (see Lingle, Altom and Medin 1984) the authors claim that both rely similarly on memory for prior episodes rather than on higher-level units. Analytic processes are not precluded and the choice between the two modes is seen as depending on the particulars of processing.

The above view of categorization seems to parallel most closely the description in cell 12 of Table 2-1 and has found a number of proponents in the literature. Smith and Kemler Nelson (1984) have contrasted the analytic and nonanalytic modes referred to earlier and claimed that access to overall similarity relations (i.e., those that form the basis for nonanalytic comparisons) might be direct and nonderived. Significantly, they argue that even though it might be possible to identify similarity relationships in terms of component properties, such relationships may not have psychological reality for the processor when overall similarity relationships are evaluated. That is, individuals might assess similarity between two entities

by comparing them as wholes. The latter could occur even if the two objects possessed similarities in terms of component attributes and the observer was cognizant of such attribute-based similarities. Such global or holistic similarity assessment is viewed by them to be more frequently used when processing is somehow limited than when it is unconstrained. The domain of enquiry in which such contending theoretical accounts are examined by Kemler Nelson and her colleagues (Foard and Kemler Nelson 1984; Smith and Kemler Nelson 1984; Kemler Nelson 1984) is that of perceptual categorization. In discussions of the latter, two types of dimensional combinations have been suggested, unitary and analyzable (Shepard 1964), as well as integral and separable (Lockhead 1966; Garner 1974, 1977). Size and brightness are said to be separable dimensions while saturation and brightness are said to be integral dimensions. Empirical studies in the area have investigated differences in similarity judgment with respect to patterns that differ on the above dimensions. Based on the above, Garner (1974) has claimed the following (a) when patterns include separable dimensions, individuals tend to process in an analytical fashion. That is, attention is directed towards individual dimensions followed by some form of aggregation of the characteristics to reach a judgment (i.e., with respect to similarity between two patterns). If individuals are asked to judge the "overall similarity"

between two patterns both involving separable dimensions, then such analytic judgments are made first, followed by combination of the individual dimensions to assess overall similarity. In other words, for patterns characterized by separable dimensions analytic similarity judgments are initially undertaken, followed by combinatory processes to arrive at global judgments (b) for patterns that include integral dimensions, judgments of similarity are based directly on assessment of global judgments without reference to processing by parts. Smith and Kemler Nelson (1984) have challenged the above, claiming that global similarity for separable stimuli are not necessarily recombinatory requiring initial assessment of dimensional relations, but that such (i.e., global processing) could in reality reflect "primitive" processing. Their program of research has systematically examined various contingent dimensions (e.g., stimulus aspects such as complexity, integrity; perceiver characteristics such as developmental stage, retarded versus "normal" individuals; task manipulations such as speed, concurrent load, incidental versus intentional learning) with respect to classification patterns providing evidence for both analytic as well as holistic or "non-strategic" cognitive processes.

The separable versus integral distinction and its implications in terms of perceptual categorization processes

among children and adults was investigated by Smith (1981). The traditional view in the developmental literature was that young children perceive objects as wholes and classify them by holistic similarity relations, while older children and adults perceive objects as conjunctions of attributes and classify objects by those attributes. Smith's studies showed that the above was true only in the case of extremely simple stimulus variations. As the variations between objects became more complex overall similarity relations were used by children as well as adults in classifying objects. Similarly, Kossan (1981) examined whether concept acquisition strategies varied as a function of the complexity of the internal structure of the concept to be learned, and whether children at different developmental levels preferred one strategy over another. In her experiment, concepts defined by necessary and sufficient features (a two-feature conjunctive rule) were acquired through a feature abstraction strategy by both second and fifth grade subjects. For more complex concepts an exemplar matching strategy seemed to be used by both second and fifth graders.

A similar view of exemplar retrieval in categorization processes is advanced by norm theory (Kahneman and Miller 1986). In their view, normality judgments with respect to ongoing events, behaviors, etc., are made through retrieval of specific episodes guided by the characteristics of the evoking stimulus

and the momentary context. Thus events might appear to be more normal not necessarily if they confirm advance expectations, but if they recruit familiar episodes from memory and are interpreted in conjunction with it. In general, selective retrieval of pertinent episodes is believed to reduce surprise and to favor hindsight about both the recent events and its predecessor.

Working in the domain of social judgment and inference making, Read (1983) has demonstrated that as a particular cause-effect relationship becomes complex, or in the absence of a known causal relationship, people tend to make predictions based on the overall similarity of a new instance to a similar instance experienced in the past. In Read's studies, subjects learned about members of a foreign culture some of whom performed a rule-governed behavior. Subjects then predicted the behavior of other (new) members of the culture. One of the latter was similar to an individual who performed the behavior, but the rule predicted that this new member would not perform the target behavior. Results showed that subjects relied on the similarity of the new member to the previously encountered individual in making the predictions. Further, it was found that reliance on the single instance increased as the rule governing the behavior became more complex and that such judgments were made quite confidently. The role of concrete exemplars in judgment making has also been demonstrated by Gilovich (1981). In his field experiments,

sports writers and football coaches were asked to rate five hypothetical college football players for their potential to play professionally. In three experimental conditions a similarity relationship was designed between the targets and a current professional player, while in the control condition such associations were absent. Results indicated the subjects rated the targets in the experimental conditions significantly higher than in the control condition. Similar results were also observed in a different experiment in which subjects judged potential moves to solve an international crisis when information on "similar" past events was manipulated between conditions. While interesting in themselves, Gilovitch's results need to be interpreted keeping in mind that adequate controls on subjects' prior knowledge, task orientations, etc., were not enforced precluding more definitive conclusions regarding adopted cognitive mechanisms. While exemplar-based nonanalytic processes might have led to these results it appears that subjects in both Read and Gilovitch's studies might also have retrieved concrete instances and compared the latter with the given targets in an aspect-by-aspect or analytic fashion (see cell 6 of Table 2-1).

While the body of research discussed under the exemplar view signifies considerable enthusiasm, the perspective is not without its critics. Martin and Caramazza (1980) for example, report a series of experiments that compare a sequential feature

testing model to probabilistic and global similarity models. Schematic faces were used as exemplars for two sets of categories, one "well-defined," in that criterial features could be employed to describe their internal structure and the other "ill-defined," in that no simple criterial rule could be invoked to classify all the stimuli in these categories. Using a variant of the standard concept learning and classification paradigm they found that regardless of whether categories had criterial features subjects attempted to develop a set of features that would allow them to categorize the test exemplars. Based on the above, they claim that although no simple rules were possible for the family resemblance structures, this did not deter subjects from using this approach, even though very complex rule systems were necessary. The complexity of the necessary rules resulted in a high percentage of subjects' failing to learn the categories. Thus, it is claimed that whatever the structure of the concept, individuals evidence a "common processing strategy" based on a search for the most efficient set of rules. McAndrews and Moscovitch (1985), working with categories of letter strings generated from finite-state grammar found evidence for inductive learning of syntactic rules and their use in judging the grammaticality (i.e., category membership) of novel letter strings. They claim that even when subjects had limited experience with richly-structured stimulus domains (as with

artificial grammar learning), they implicitly induced feature-based concept rules. This, then, is inconsistent with an instance-based model of categorization. Further evidence for such implicit concept learning and rule abstraction is provided by Gordon and Holyoak (1983). Using artificially constructed letter strings similar to those employed by the previously described study, they found that positive affect produced by repeated viewing of a set of stimuli generalizes to previously unseen stimuli that are viewed as obeying the rule system that characterizes the original letter strings. Gordon and Holyoak have described such an implicit rule induction process as automatic and claimed that such processes might actually mediate the "mere exposure" effects reported by Zajonc and forwarded to support the mutual independence of affect and cognition.

In addition to the above, the exemplar view has also been variously critiqued primarily for its lack of specificity with respect to certain exemplar retrieval assumptions. For example, it is not clear whether in executing the above model the single "best example" of the category is retrieved (i.e., the focal instance: Rosch 1975), or a number of learned examples are retrieved and somehow compared sequentially until a satisfactory match is observed. If the former, then questions remain with respect to how the individual determines the best exemplars. In the case of the latter, the issue of a criterion of "fit" becomes

critical and it is not immediately apparent how these different comparisons might weigh in the final judgment. Smith and Medin (1981) have addressed this issue by positing that an entity will be classified as an instance of a category, if and only if it retrieves a critical number of exemplars from any contrasting category. (Also see Lingle, Altom and Medin 1984, for a similar position.)

While exemplar-based processing might in concept be analytic, that is, involving piecemeal aspect comparisons on both critical as well as idiosyncratic features, proponents of this perspective have largely tended to allude to a nonanalytic process under different labels -- "holistic," "global," "nonstrategic," etc. As pointed out by Cohen and Basu (1987), "demonstrating the operation of nonanalytic versus analytic processing in a categorization task is a formidable undertaking" (Cohen and Basu, 1987, p. 464). Besides being able to develop methodologies that are reliable and sensitive in identifying each, significant precision must go into defining these, especially with respect to the nonanalytic mechanism. It is the position here that similar to that described in the introductory sections of the exemplar view, a nonanalytic categorization strategy based on retrieval of concrete exemplars views the latter as "information wholes" that have meaning in themselves, regardless of whether more elementary, feature-level meanings are

available. A parallel may be drawn here with the classical theories of attitude. Even though more fundamental cognitions regarding an attitude object may be available (i.e., beliefs, evaluations), once an attitude has been formed, "when the concept is presented, it will elicit this summative evaluative response, that is, it will elicit this learned attitude" (Fishbein, 1967, p.394). That is, the overall attitude is elicited upon presentation, without further access or recombination of what might have constituted its more primitive elements. Nonanalytic classification involves the contextual retrieval of such meaningful entities, which are then compared to target objects at this overall level, without any decomposition into constituents. As previous discussions have suggested, such overall semantic comparisons are not necessarily different from perceptual classifications involving general similarity relation-ships (Jacoby and Brooks 1984) and are premised on the notion that rapid preperceptual mechanisms render such molar representations available in memory along with potentially more abstract ones.

The exemplar and nonanalytic accounts of categorization appear to be at least intuitively attractive to consumer researchers. Surely, consumers have access to a large number of brands in a variety of product categories and such molar brand representations might coexist in some cases with more formal category-defining rules. Brands are often viewed as having an

identity of their own (Levy 1959). Similar to people, necessary as well as idiosyncratic features combine to create distinct identities and consumers might feel predisposed to think about and decide among brands at this global level. Cohen and Basu (1987) suggest that

> in a supermarket setting, for example, it seems likely that an unfamiliar product offering will be categorized and evaluated on the basis of a high degree of overall similarity to an exemplar of a particular category, a notion which has been exploited in package design and which sometimes results in the purchase of a product that, on closer inspection at home, is different from the product the person was intending to buy.
>
> (Cohen and Basu, 1987, p. 463).

Thus, at the outset it might be useful to presume that both analytic processes based on information regarding features, as well as nonanalytic processes based on retrieval of concrete instances are strategy variants that might guide consumers' classifications. Attention may now be directed towards contextual variables that might systematically bias one mechanism over another. The following section develops such a contingency-based processing view.

The Mixed Model: A Contingent Processing Framework

The last decade has witnessed several lively controversies with regard to which of the several categorization models

represents the "true" nature of the structure of knowledge in memory, as well as with respect to the classification process. An emerging view seems to indicate that both abstractions and concrete entities might coexist and that analytic as well as nonanalytic mechanisms might each provide accurate accounts of the phenomenon in particular contexts and settings. In support of such a "mixed" model of categorization, Lingle, Altom and Medin (1984) claim that "given the problems of both the probabilistic and exemplar views in isolation, an attractive alternative is that concepts contain both probabilistic and exemplar components." (Also see Elio and Anderson 1981; Smith and Medin 1981). Such a mixed model then would provide a means for accounting for configural information, instance variability, correlations between features and guiding mechanisms for updating or modifying summary representations. Espousing a similar view, Smith and Medin (1981) suggest that such mixed representations might develop as a function of the maturation process. For example, children might initially represent concepts in terms of exemplars and later apply an abstraction process to the latter to yield a summary representation. They claim that as long as they do not discard the exemplars, mature learners would end up with both exemplars and a summary representation of the same concept. It is even possible that this developmental sequence occurs to some degree whenever adults learn a new concept. Other aspects

of concept learning and their ramifications in terms of the resulting representational form, have also been discussed in the literature and will be dealt with shortly. D'Astous (1986) has drawn striking parallels between such "mixed" or what he terms "multi-level conceptual structures" and similar views in the psychology literature. He claims that in concept-learning experiments involving artificial stimuli subjects often demonstrate that such concepts are represented in a "mixed" form, i.e., involving both specific instances (e.g., artificially constructed letter strings, etc.) as well as more general grammatical rules regarding these. Citing Abelson's (1976) work on scripts--i.e., cognitive structures, he describes the latter as existing at three processing levels: episodic, categorical, and hypothetical. Episodic scripts refer to temporally dated sequential events (e.g., last week's grocery shopping trip). Categorical scripts in contrast are generic, i.e., corresponding to prototypical event-based situations (e.g., a typical grocery shopping trip). Finally, hypothetical scripts are at the highest level of abstraction and designate feature-based/computational mental operations (e.g., a cognitive rule that allows a person to evaluate grocery shopping experiences). The similarity with exemplar, prototype, and features and rule-based categorization processes is striking. Such structural distinctions are also sought in theoretical accounts of schema-based processing: "a

schema can be thought of as a pyamidal structure, hierarchically organized with more abstract or general information at the top and categories of more specific information nested within the general categories. The lowest level in the hierarchy consists of specific examples or instances" (Taylor and Crocker, 1981, p. 94). Alba and Hasher (1983) have also indicated that abstraction in schemas is not inevitable and that memory for details is often excellent. A final similarity lies in the area of decision making. Referring to Tversky and Kahneman's (1974) work on decision heuristics, the role of "availability" and "representativeness" are cited as reflecting similar distinctions as in the exemplar and prototype views of categorization. Empirical support has been found for both the above simplifying heuristics, in that people are found to base their probability or frequency assessments of occurrences of certain events upon the ease with which they can retrieve specific instances from memory (i.e., availability) and in utilizing knowledge regarding population parameters in judging how representative a sample event is of the population.

Thus, there appears to be some convergence with respect to the coexistence of the two forms of information (i.e., summary abstractions and concrete instances) and their mutual importance in various information processing activities such that the research task becomes one of specifying which circumstances

increase or decrease the accessibilities of summaries and exemplars. A second, related issue is the nature of the processing mechanism, i.e., analytic or nonanalytic. As our previous discussion has pointed out (especially Table 2-1), retrieval of concrete instances in itself does not imply that holistic relationships will be evoked to classify novel items just as global similarities to hypothetical prototypes seem to be at least plausible in principle, one that has been alluded to in some prior research. It might be useful (Cohen and Basu, 1987) to assume a certain degree of flexibiity in this regard allowing for either, depending on the nature of contextual variables. Cohen and Basu (1987) also suggest some sort of a stage "analysis" by speculating that "in any given categorization instance there may lie a 'first cut', using the most efficient means of making a quick judgment, and this could be followed by processes that would give greater precision, if they are deemed necessary" (Cohen and Basu, 1987, p. 463). Similar notions of a staged or evolution of processing activities may be found in d'Astous (1986) and Brooks (1978) who claim that consideration of the categorization task is important in understanding the sequence of mechanisms. Given certain types of processing contingencies (e.g., low levels of motivation, incidental learning, processing constraints, relatively high levels of familiarity to the target, etc.), matching based on global (i.e.,

nonanalytic) similarity to a few memory exemplars might be primary, which then might unfold further to include more deliberate processes with reference to elements depending on concurrent nature of the contingencies. (Also see Lockhead 1972, 1979; and Ward 1983 for similar arguments.)

The proposed "mixed model" then, includes variants that reflect different combinations of the fundamental information processing dimensions discussed earlier. In attempting to decide which ones of these twelve potential models (see Table 2-1) are likely to be the most appropriate and useful in the study of consumer behavior, Cohen and Basu (1987) suggest that the "level of automaticity" issue, though important is probably less directly relevant to consumer behavior and certainly the most difficult to investigate in typical consumer settings of interest. Further, the conceptual distinctions between purely rule-based representations of a prototype and that of a hypothetical entity, though conceptually noteworthy, the respective models (7 and 10 for the former, and 8 and 11 for the latter) are virtually indistinguishable for purposes of empirical investigations of classification processes or studying the consequences of category assignment. Thus, without attempting to finnesse theoretical distinctions between the cells some dimensional reduction as well as merging might help to focus attention on some of the more intuitively plausible models of

categorization in the consumer context. Thus, four generic classes of categorization models "Exemplar-Analytic," (cell 6) "Exemplar-Nonanalytic," (cell 12), "Rule-Analytic," (cells 4 and 5) and "Rule-Nonanalytic" (cells 10 and 11) have been suggested and exemplified by the above authors for inclusion in an overall processing framework. The next section is devoted to a discussion of the various contextual aspects that have been postulated to guide the adoption of specific categorization mechanisms.

A fairly large number of these have already been suggested in the literature. Figure 2-1 shows the presentation framework that will be adopted in the discussion of these. The organizational heuristic used in the latter parallels the classic interactionist perspective that views behavior as a function of stable individual characteristics and aspects of the environment where such are found to occur (Kassarjian 1973). In an analogous fashion, adoption of a particular categorization strategy is believed to be determined by both enduring characteristics of an individual and characteristics of the judgment context. We begin then, by describing the nature of influence of each of these factors.

Enduring Individual Characteristics

Individuals might be characterized as possessing two different types of characteristics that might influence

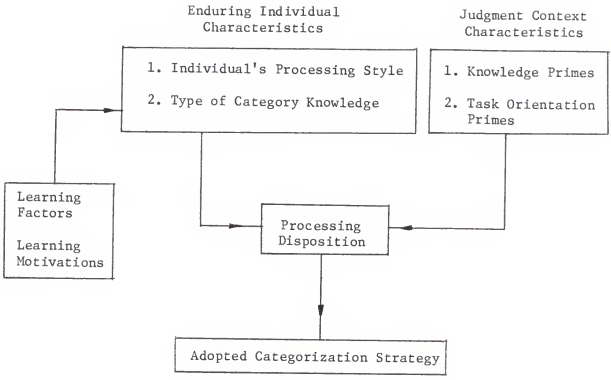


Figure 2-1

A Framework for Processing Contingencies

processing strategies: The first pertains to a general processing orientation across different types of mental activities; the second concerns the type of information an individual possesses regarding a given category of products based on the history of prior interactions. Following sections will discuss these.

Individuals' processing styles

A few categorization researchers have advanced the notion that classification processes might reflect cognitive strategies that show individual differences (Mervis and Rosch 1981; Cooper 1976; Cooper and Podgorny 1976). Although largely unexplored within categorization theories, the issue of individual differences in processing activities has received some attention both within psychology and consumer behavior literatures. Investigating fundamental processing issues in the area of perception, Cooper (1976) examined subjects' "same/different" judgments to a set of schematic forms that were charcterized by various degrees of perturbation. Differences in performance between groups led her to suggest that "Type I and Type II subjects may compare a visual memory representation with an external visual form in qualitatively different ways. One possibility is that the faster Type I subjects use a holistic

process in comparing an internal representation with a visual stimulus, while the slower Type II subjects use a more analytic comparison process." While such results appear to be quite robust, mechanisms to explain such rapid holistic comparisons are yet to be fully appreciated.

An issue that has received some consideration in the consumer literature concerns the ability versus preference of individuals to engage in specific cognitive activities. Capon and his colleagues (Capon and Burke 1980; Capon and Davis 1984) have investigated the "ability" dimension based on subjects' performance on information acquisition tasks. Richardson (1978) has however, argued persuasively that "coding efficiency" (ability) and "coding preference" are relatively independent dimensions along which individuals might vary. Claiming that dominant cognitive styles are critical in understanding individuals' tendencies to utilize one strategy over a set of alternatives, he found that performance on memory recall is significantly related to processing preference rather than processing strategy.

As summarized by Golden and Johnson (1983), early definitions of cognitive styles were based on trait pairs such as reflective-impulsive, field dependent-field dependent, and broad-narrow categories of organizing information. More recently, complex and integrated style dimensions have been proposed by

Harrison and Bramson (1982) with five categories of styles: synthesist, idealist, pragmatist, analyst, and realist. Each of these are believed to be related to characteristic approaches to the processing of stimuli. Another distinct approach to the study of cognitive styles comes from the psychobiological orientation of hemispheric lateralization (Hansen 1981). According to the latter, the ability to verbalize and to perform other sequential tasks might be related to increased activity in the left cerebral hemisphere of the brain. Holistic perception, the ability to register memory data and construct a gestalt, is believed to be associated with increased activity in the right cerebral hemisphere. That is, the left brain is believed to work sequentially, temporally, verbally, intellectually, rationally, causally, logically, and argumentally, while the right brain is more diffuse, spatial, intuitive, musical, pictorial, and more concerned with nonverbal information (Krober-riel 1979; Kane 1984). Individuals are characterized within this perspective to be either left or right brain dominating which in turn is believed to significantly affect their response to external stimuli, as well as processing activities. Though not directly examined in a consumer context, notions such as the latter have found their way into some of the more recent conceptualizations of processing styles. Holbrook, Chestnut, Oliva, and Greenleaf (1984) have introduced a self-report scale, the

Verbalizer/Visualiser index, which focuses on the comparative strengths of verbal versus visual associations and assesses an individual's tendency towards verbalization/ visualization. Drawing on Cohen, Scotland, and Wolfe's (1955) early work, Cacioppo and Petty (1982) have developed a scale to measure an individual's need for cognition. It is claimed that individuals with high need for cognition enjoy effortful analytical thinking, prefer abstracting and elaborating on information, and also evaluating its utility. Individuals low on such a dimension are believed to prefer simpler, less effortful tasks. Recently, Childer, Houston, and Heckler (1985) have proposed a "Style of Processing" (SOP) scale that is aimed at tapping into individuals' verbalizing/visualizing proclivities across different mental tasks. The SOP scale was found to possess high internal consistency, discriminant and criterion validity. Nomological validity for the latter was also supported through observing expected correlations with indicators of hemispheric lateralization, the verbalizer/visualizer index and the need for cognition scale (Childers, Heckler, and Houston 1987). Using a different instrument to measure individuals' processing preference, the Oakland Inventory of Cognitive Style (Keedy 1978), Golden and Johnson (1983) investigated the effects of sensory preference (visual or auditory) and two types of advertising appeals (thinking versus feeling) on subjects'

ratings of affect, believability, quantity of information, usefulness, and purchase intentions in four different product categories. Although some mixed results were obtained, they found support for an interaction between sensory preference and stimulus type on measures of advertising effectiveness. Besides the above, i.e., more focussed aspects, general notions of processing predispositions might also be found in certain personality-type inventories. For example, drawing on familiar Jungian notions, the Myers and Briggs (1962) inventory attempts to classify individuals into types corresponding to their dominant orientations in areas of perception and judgment (i.e., sensing versus intuiting, thinking versus feeling).

The diverse research orientations and findings described above might have important ramifications in terms of explaining the influence of individuals' cognitive styles on the adoption of specific categorization mechanisms. It might be intuitively appealing, for example, to believe that individuals that are right-brain dominant, primarily visualizing, low in need for cognition, and demonstrating more intuition and feeling in perception and judgment would be more likely to engage in nonanalytic categorization, while complementary characteristics would render one more likely to adopt analytic mechanisms. One word of caution appears to be appropriate. Even though interesting at the level of analogy these diverse formulations

are not specific enough with respect to categorization processes. Even though there might be significant relationships between imagery, iconic representations and perception-like processes, and categorization strategies based on retrieval of concrete instances, the latter is not necessarily limited to the domain of perceptual identification. Semantic categorization tasks have also provided some evidence (Smith and Medin, 1981) in favor of retrieval of exemplars, i.e., in terms of their global meanings, and at least on this point it is not clear that individuals characterized as "low verbalizers" would necessarily disdain from such semantic comparisons. Probably more specialized instruments reflecting the specifics of the categorization mechanisms in addition to drawing upon some of the aspects of the above-mentioned scales, would be necessary to investigate the role of processing styles in our contingency framework.

Type of category knowledge

As described earlier (Rosch 1978; Garner 1974), individuals are believed to possess relatively stable conceptual structures regarding their prior experience and view of the external world. While both category structure as well as the information content of categories are open to change, depending upon the nature of continued integrations between an individual and his/her

environments, a relatively high level of stability is presumed. That is, individuals are believed to carry with them specific types of information regarding a category/s as they move from one situation to the next.

Potentially, a large number of distinctions might be made with respect to the type of knowledge an individual possesses regarding a given category. Those most germane to our understanding of categorization mechanisms concern the exemplar and/or rule characteristics of the category representation. At least three different characteristics might be posited as potentially significant. These include the extent to which exemplars/rules are available to an individual; the dominant form of representation, i.e., episodic or semantic; and the level of complexity associated with any given category-defining rule.

There might be significant individual differences with respect to the availability of exemplars and/or rules and their relative accessibilities in a given judgment context. For example, if an individual's representation of a category consists entirely of, or is dominated by exemplars, then processes that involve comparison of a target instance to the latter might be more likely in a judgment context. If however, a category is primarily defined by a particular featural rule/s, then rule-analytic comparisons might be invoked more readily. Similar relationships could be envisaged with regard to the relative

accessibilities of exemplars and rules, bringing into focus factors that contribute to the latter (i.e, salience, distinctiveness, frequency, recency, etc.). In the event a combination of exemplars and rules are available in a judgment context, contingencies such as the above might weigh in favor of specific mechanisms.

Some memory researchers have advanced distinctions between episodic and semantic systems (e.g., Tulving 1972; Lachman, Lachman and Butterfield 1979). In such views information regarding an entity (object, person, event, etc.) might be represented either in an individual's episodic, semantic or in a combination of both systems. The episodic system is essentially personal, relating to specifics of interactions with concrete entities, i.e., those that can usually be translated into the form: I did such and such, in such and such a place, at such and such a time. It is believed to recapture the temporal and spatial context of a person's past experience as on a recording tape. Semantic memory, in contrast, is believed to contain abstract, generalized, symbolic information regarding an entity/s. Such knowledge consists of words, their meaning, referrents, and rules or algorithms for manipulating words and symbols. Information regarding a group of products/brands could be represented pre-dominantly in terms of either of these two memory systems. Such could be the case depending upon the nature

of learning environments. The relationship between retrieval of episodic information and exemplar-based processing seems to be fairly intuitive just as semantic-systems and analytic processing appear to embody consistent notions.

In addition to the above issues, the extent of complexity of a given category-defining rule is also likely to influence the adoption of categorization strategies. Many categories do not appear to have straightforward defining rules but instead, involve probabilistic relations, disjunctive combinations of attributes, and correlated features. While complex rules might indeed be acquired, special contingencies seem to be necessary i.e., relatively high motivational levels, as well as special learning conditions that provide opportunities for multiple presentations of concept instances, some processing guidelines, and probably some feedback. In any event, increasing the internal complexity of a category, either by including many more aspects in the rule, or affecting the nature of relation-ships between the attributes, is believed to strain people's cognitive resources rendering successful acquisition and use of feature-based analytic categorization strategies less likely.

The above discussion points at a number of complex issues pertaining to the type of category information that might be possessed by an individual. Further, a number of category acquisition conditions might be critical in determining these

exemplar/rule characteristics. Research in cognitive psychology has investigated some aspects of category-learning contexts and their influence on subsequent categorization processes. These will be presented next in two sections. The first pertains to characteristics external to the individual, while the second deals with specific motivations concurrent with category acquisition.

Learning Factors. A number of aspects peculiar to category acquisition have been discussed in the literature. Homa (1984), for example, has identified seven variables that modify the form of a category as determined by performance on a later transfer test: a) category size (or number of different exemplars per category); b) stimulus distortion (variance); c) number of categories; d) category similarity; e) type and availability of feedback during learning; f) memorial set and decisional influences; and g) the passage of time. According to Homa,

> the acquisition and utilization of conceptual information may be broadly conceived as a problem in sampling theory, in which the organism attempts to comprehend the meaning of a category by sampling its members from the category domain. Two related principles probably underly the acquisition of ill-defined categories and the subsequent generalization to novel experiences: sampling from the stimulus domain pertinent to a category and making inferences about the parent population. It is likely that variables like category size, category similarity, number of categories, and stimulus distortion are important to subsequent generalization because these

> variables are critical to making accurate judgments about the membership of novel stimuli.
>
> (Homa, 1984, p. 62.)

Homa and Vosburgh (1976) have claimed that sufficient experience with exemplars leads to prototype abstraction and generalization gradients are primarily anchored to the prototype and less to individual exemplars (see Alba and Hutchinson 1985 for a similar view vis-a-vis expert and novice consumers). Under the general label of "Concept Factors," Smith and Medin (1981) have also discussed the influence of the nature of the stimuli encountered during concept acquisition on the form of the representation as well as subsequent categorization processes. They claim that ceteris paribus, if the instances of a concept share numerous (nondefining) properties, that concept will likely be represented in probabilistic form; if the instances share few properties, that concept is likely to be in exemplar form. The greater the intraclass similarity, the more likely it is that the representation will be in the form of a summary rather than in the form of exemplars.

Cohen and Basu (1987) have described two additional aspects of the learning context that might have substantial impact on categorization. The first of these concerns the acquisition process itself; i.e., either involving memorization of the exemplar/s, or use of a formally acquired rule for interpreting

and encoding instances. We argue that much of natural concept learning beginning in childhood is focused around a name-picture paired associate rather than a definitional rule (e.g., pointing and saying "cat"). We claim that individuals typically possess a rich store of episodic information regarding entities which might be subsequently utilized for information processing activities. There might also be contexts, or even entire classes of products, in which concepts might be acquired through a definitional process possibly involving criteria that have been learned formally (e.g., financial instruments). For such categories, it might be functionally more efficient then to retrieve and invoke criterial rules. In fact, a broad typology might be envisioned including two types of concepts, those that are more experiential, versus those that might be somewhat more abstract and acquired primarily using formal relationships. Thus, we propose that "conditions that favor category acquisition through a definitional process (i.e., involving learning the formal relationships between more abstract/nonperceptual aspects of an entity/s) lead to greater reliance on rule-based analytic processes in subsequent categorizations" (Cohen and Basu, 1987, p. 464).

A second learning factor discussed by the above authors concerns the role of marketing activities in communicating rules that may be functional in differentiating between brands within a

product category. We claim that some types of advertising might be "instrumental in focussing attention on features which implicitly differentiate brands" (p. 466). Also, a great many advertising campaigns are directed towards creating complete portrayals of brands, providing significant details with respect to necessary (i.e., discriminatory) as well as idiosyncratic aspects of the brand, its context of consumption, personalities of consumers, etc. These might endow the brand with a distinct meaning that is functionally autonomous from those associated with any criterial or category defining attributes.

Learning motivations. The nature of individuals' task orientations and motivations might also influence the type of category knowledge that is acquired. Certain learning contexts might influence the nature of these task orientations. A number of recent studies have shown that the type of instructions communicated to subjects at the outset of a concept acquisition task impacts on subsequent classification processes. Specifically, conditions of "intentional learning" seem to favor analytic categorization, while "incidental learning" conditions heighten the likelihood of nonanalytic strategies. In an influential paper, Kemler Nelson (1984) argues that a significant number of categories that we possess were acquired under incidental concept learning, as opposed to most concept acquisition paradigms where instructions on impending

classification tasks create an intentional learning context. In the latter,

> the subject is a deliberate hypothesis tester, systematically formulating and checking guesses about the solution rule -- hypotheses based on selected attributes of the stimulus items (e.g., Bruner, Goodnow, and Austin 1956; Trabasso and Bower 1968).
>
> What subjects learn about categories under these circumstances may be very different from what they learn when such problem-solving strategies are not activated.
>
> (Kemler Nelson, 1984, p. 734-735.)

In her experiment, the nature of the task was manipulated between conditions, one of which received standard classification forewarnings (i.e., intentional), while in the other, learning stimuli were presented under the cover of a recognition memory task. Kemler Nelson found that incidental learning conditions favored the use of holistic processing (as determined through performance on transfer tests), while intentional learning led to more analytic processing. These results are similar to those reported by Brooks (1978) whose learning manipulation included both classification as well as exemplar memorization instructions.

Similar notions pertaining to learning motivations have been discussed by Cohen and Basu (1987) in terms of the presence or absence of multiple (even contrasting) categories during

acquisition. We claim that learning that accompanies exposure to exemplars from contrasting categories of products might focus attention on characteristics that discriminate the two groups and encourage subsequent use of simple heuristics based on such features. It is argued that, in reality most concept learning occurs in contexts that do not encourage discrimination. In other words, typically we tend to experience individual entities in some depth and richness, and seek to group them by observing similarities rather than by searching for distinctions between members of rival sets. There is thus little attention to discriminatory (i.e., criterial or characteristic) aspects between categories, and such "indepth" exposure to exemplars of a category might lead to greater reliance on exemplar-based and nonanalytic processes in subsequent categorizations. Concepts that are acquired through explicit or implicit consideration of contrast categories might lead to specific task orientations and greater likelihood of feature-based analysis.

Judgment Context Characteristics

Two general types of factors pertaining to the category-judgment context could affect the nature of adopted processing mechanisms. These include a) those cues that prime certain types of category information (i.e., particular rules/exemplars),

rendering these available for processing purposes; and b) those that lead to certain processing goals and associated task orientations. The following section will discuss each of the above.

Knowledge primes

Aspects of stimuli in a judgment context might be speculated to lead to certain processing pre-dispositions. First, the presentation form of the information would seem as one such aspect. As discussed earlier, different processing systems (i.e., semantic/episodic) and strategies (i.e., rule/exemplar-based) might be evoked when an individual encounters stimuli (i.e., actual product displays, ads, etc.) described either pictorially or through words. Second, presenting information on competing brands in terms of the features possessed by each (as in comparative advertising) might lead to priming of feature-based rules (if such exists) defining the relevant product categories. Similarly, package designs or certain creative treatments in advertising might invoke concrete images of previously-experienced exemplars. Third, the categorization process might be quite different depending on whether the setting emphasizes a range of behaviors/judgments pertaining to a focal target object, or instead, increase the salience of the category

itself. In the former case, distinctive attributes of the target might be given more weight, being the point of reference, and category exemplars that share such features might be retrieved selectively. When the category is in focus, frequently/recently encountered exemplars, or even attribute-based rules might be evoked, depending upon the presence/absence or relative saliences of respective primes in the context.

Task orientation primes

A fairly large number of contextual aspects might lead to consumers' adopting specific processing orientations. These include characteristics that guide consumers' general processing and behavioral activities within the environment, a well as more specific motivations therein. A significant development in recent consumer research with respect to the former, is the appreciation of the notion that a wide range of consumer activities might be characterized by low involvement. With respect to a significant number of product classes (Lastovicka 1979), decisions (Hoyer 1984), and situations, consumers are found to rarely engage in deliberative behavior, and for such, exemplar-nonanalytic strategies would seem to be functionally quite efficient. At higher levels of activation or arousal (see Cohen 1983) greater attention might be directed towards specifics

of the task on one hand, and particulars of the target on the other, probably leading to more effortful and analytic processing. An interesting relationship might be sought here with respect to general processing involvement and the level of complexity of a categorization rule that might be available to an individual. Describing factors that contribute towards effortful piecemeal processing, Fiske and Pavelechak (1986) claim that as stimuli become more complex people tend to employ simpler inferential mechanisms. Alba and Hutchinson (1985) have similarly argued that even if consumers are highly motivated, the complexity of brands in a given product market might render complete and systematic approaches to choice well beyond his/her capacity. This might be so because discovering and using a rule implies first, a desire to engage in some abstractive processing, and second, being able to do so. For the rules that are structurally simple (e.g., involving one or two conjunctive features) there might be obvious efficiencies in analytic processing.

More specific aspects include factors that affect processing motivations through their impact on perceived processing opportunity. As described by Fiske and Pavelechak (1986), there might be severe limitations on "online" information processing capabilities as a function of a perceiver's assessment that a judgment needs to be made immediately, or due to

distractions and other competing stimuli in the environment. Ward (1983) has reported three studies in which the time available for processing ("response-tempo") was manipulated between conditions. Using the standard perceptual categorization research paradigm (i.e., involving instances varying on both integral and separable dimensions), he found that for adults as with children, rapid responding was associated with fewer dimensional and more similarity responses, than was slow responding. Even though other evidence on time limitations and presence/absence of distractions are as yet unavailable, there seems to be some intuitive basis for expecting that nonanalytic processes would be more likely when processing capabilities are constrained.

A final consideration involves specific processing motivations arising out of perceptions of task requirements. Cohen and Basu (1987) claim that if consumers perceive the problem at hand to be one of object identification and assignment, then aspects of the stimulus that are pertinent to discrimination (i.e., with other instances) might be brought into sharper focus provoking the construction of a categorization rule (if one did not already exist) and prompting its use. Choice between alternative brands might heighten such rule formulations and usage, but when such explicit focus on categorization is absent, more global mechanisms might be adopted.

Summary

The contingency-based view is an attempt to provide an interactive picture of categorization processes. In other words, factors such as enduring individual characteristics and those of the judgment context in tandem influence which strategy will be adopted by an individual. For example, even though a consumer might have sufficiently high motivation in a given setting, perceived time pressures might preclude him/her from adopting an effortful analytic strategy. Similarly, perceptions of significant consequences to a product choice might provoke a consumer to look for and develop a feature-based rule to be used analytically in reducing alternatives from a set of brands. Going back to our early discussions on consumers' perceptual and evaluative judgment processes, the contingency-based categorization framework seems to provide some attractive advantages. First, it is no longer necessary to presume that all such processes are analytic, i.e., of the information integration or algebraic model variety. Instead, a range of processing mechanisms is suggested that range from those considered to be highly deliberate and effortful to more spontaneous strategies. Further, in delineating a range of factors that might be systematically related to specific mechanisms a more proactive research orientation is available. Consumer researchers, as well as marketing practitioners might in the future be able to describe specific product/brand perception and evaluation

environments in terms of such process-contingent dimensions, thereby predicting which of the strategies would be potentially dominant. Before such an exploration of the contingencies is embarked upon, however, attention needs to be directed towards appraisal and development of research methodologies that allow one to draw reliable and unambiguous inferences regarding the specific nature of these categorization mechanisms.

Research Methodologies

In some recent reviews of the categorization literature (Smith and Medin 1981; Lingle, Altom, and Medin 1984) authors have expressed concern regarding the appropriateness of currently employed research procedures in identifying competing models. It is believed that even if concepts are represented one way or the other, there can be difficulties in interpreting experimental results. The difficulties arise because probabilistic and exemplar models often make identical predictions. The complexity of the problem might be further appreciated by referring back to our description of Posner and Keele's (1968) findings and rival interpretations of the same by Homa and Vosburgh (1978) in terms of a prototype-based view and by Medin and Schaffer (1978), using a distinctly exemplar-based perspective. In the following sections, first the traditional methodology employed by categorization researchers will be presented with a few examples for purposes of appraisal, followed by a new "Verification-

Accuracy" paradigm (Cohen and Basu 1987) that appears to hold some promise in dealing with the issue of model identification.

The Category Judgment Paradigm

Studies in areas of perceptual categorization as well as concept acquisition have traditionally employed similar methodological frameworks. Experiments in the above areas usually consist of two phases (a) learning of new categories; and (b) categorization of stimuli (novel as well as training exemplars and prototypes) in terms of the acquired categories. Typically, in the first phase subjects are exposed to instances from two or more categories. Often there exists an implicit relationship between the latter, in that they might be subcategories of a more general class and potentially competing in terms of assignment of new instances. Various learning variables might be manipulated between conditions at this stage (i.e., to influence the direction of processing) and subjects may receive some feedback with respect to their learning. In addition to presenting subjects purely with instances of the categories, some form of prototype or rule information might also be communicated simultaneously, prior to, or after exposure to the exemplars (see Busmeyer, Dewey, and Medin 1984). In the second stage, subjects are provided with test instances and their classification

judgments of these are solicited. The critical aspect of the test phase concerns the construction of the transfer stimuli in relation to the design of the instances utilized in the learning phase. The guiding premise here is that adoption of different categorization models would culminate in qualitatively different classification judgments in the second phase and thus form the basis for model identification. For example, if respondents classify a novel instance as belonging to a particular learning category, with the instances of which it shares "overall similarity", while violating some criterial rule that would have dictated assignment to the competing learning category, then evidence in favor of exemplar-based nonanalytic processing is presumed. Alternatively, if respondents are found strictly to invoke the featural criteria that were utilized in developing the discrimant instances for the competing categories in the learning stage, then corresponding classifications of the test instances is seen as evidence for rule or prototype-based analytic processing. The following two examples describe the stimulus construction and inference procedures typically employed within the category judgment paradigm (example #1 has been taken from Cohen and Basu 1987).

Table 2-2 shows the stimuli from two categories that subjects acquire during the learning phase, and the two novel test instances. Each exemplar is described on four features,

Table 2-2

The Category-Judgment Paradigm: Example #1

Learning Stimuli:

	Features					Features			
	F1	F2	F3	F4		F1	F2	F3	F4
Category X					Category Y				
1)	0	0	0	0	1)	1	1	1	1
2)	0	1	0	0	2)	1	0	1	1
3)	0	0	1	0	3)	1	1	0	1
4)	0	0	0	1	4)	1	1	1	0

Test (Transfer) Stimuli:

	Features			
	F1	F2	F3	F4
a)	0	1	1	1
b)	1	0	0	0

---

a,b ... test (transfer stimuli)

X,Y ... learning categories

with 0 and 1 representing two different levels of each feature. Each exemplar belonging in category X in the learning phase has a critical value of 0 on feature F1, while all those in category Y have the value 1 on the same attribute. In addition to such a single-feature rule-defined structure, exemplars of X are characterized by more 0's than 1's (on their feature profile), while the reverse is true for exemplars of Y. The test items are also described in terms of profiles consisting of the same four attributes. As described earlier, subjects' classifications of the two test instances (i.e., either as members of X or Y) form the basis for inferences regarding adopted processing mechanisms. For example, if subjects by and large categorize (a) as belonging in X, and, (b) as belonging in Y, then it is presumed that the critical value on F1 for category membership has been identified as the basis for generalization, and hence the latter is characterized as being analytic. If subjects classify (a) as belonging in Y, and (b) as belonging in X, then it is claimed that a general notion based on "family resemblance," i.e., sensitivity to the combined profile of features has guided the observed categorizations. The latter is said to reflect nonanalytic processing (Figure 2-2).

The problem with the above inference procedure, however, is that alternative explanations might account for the "non-analytic" process result. For example, subjects during the

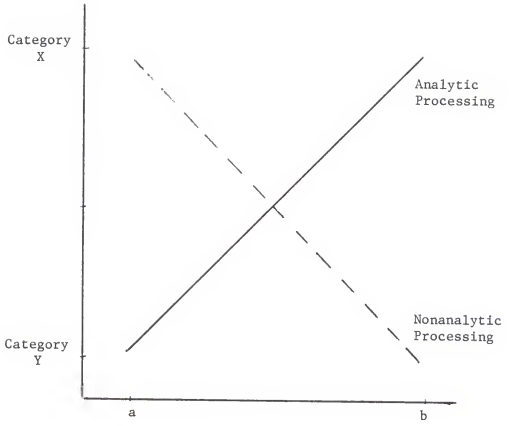


Figure 2-2

Category Judgment-Predictions Based on Example #1 (Table 2-2)

learning process might somehow abstract the multiple feature basis for discriminating between instances of X and Y. In other words, subjects discover that category X exemplars have more 0's in their profile than 1's, and the opposite for instances of Y (which in fact is the rule employed by the experimentor in creating the family resemblance between members of the two respective categories). Such a rule (based on multiple features) might then be used by subjects to classify (a) in X and (b) in Y. The latter is different from the simpler analytic strategy described earlier in that it is premised on consideration of multiple features, rather than the discrimant value on F1; in its selective focus on attributes, however, it remains fundamentally analytic in nature. Such an explanation need not be "forced" since a number of variables related to category learning might predispose subjects towards such rule abstraction and utilization. The first of these is the obvious discrimination learning context of the initial phase. Presenting exemplars from two competing categories during learning, each of which is described on a similar set of features, might draw attention to the issue of discrimination between categories rather than in-depth learning of the individual exemplars. Such a setting, then, might encourage subjects to "look for" a basis for differentiation, i.e., category-defining rules (based on available feature information) and lead to subsequent analytic

processing. The motivation to engage in "analytic thought" might also be heightened by the experimental settings unless creative "cover" manipulations are employed (for an example, see Kemler Nelson 1984). Thus, even though judgment outcomes characterized as "nonanalytic" might signify departures from a single critical feature-based categorization process, the operation of a nonanalytic process remains to be demonstrated.

Table 2-3 shows the stimulus patterns for another example employing the same paradigm. Here, instead of presenting exemplars from two or more competing categories during learning, instances from a single category are presented. Each of the latter is described on four attributes (0 representing absence, and 1, presence), and the set as a whole demonstrates different feature profiles that have a single aspect in common, i.e., features F3 and F4 are perfectly correlated across all instances of the category. In the test stage, subjects are asked to indicate whether or not the instance belongs in the acquired category. Since both the test items have similar proportions of 1's and 0's, an analytic process would predict similar classifications for both. If subjects classify (b) as a more likely member of the category than (a), then sensitivity to the feature correlation is believed to underly categorization. While this is likely, its relationship to nonanalytic processing is ambiguous. That is, it remains unclear whether or not subjects

Table 2-3

The Category-Judgment Paradigm: Example #2

Learning Stimuli:

Category Instances	Features F1	F2	F3	F4
1	1	1	1	1
2	1	1	1	1
3	0	1	0	0
4	1	1	1	1
5	1	0	1	1
6	1	1	0	0
7	0	1	1	1
8	1	0	0	0
9	0	0	1	1

Test (Transfer) Stimuli:

(a)	1	1	0	1
(b)	0	1	1	1

had stored the correlation information selectively as part of a rule to be applied vis-a-vis the test stimuli. If indeed such had been the case, then the above performance could also be explained by an analytic process, i.e., one that selectively focuses on the two (correlated) features and bases judgments depending upon their joint presence or absence.

Our discussion points at some fundamental weaknesses associated with the category-judgment framework in terms of drawing unambiguous conclusions regarding processing routes. Partly, this is so because in order to demonstrate nonanalytic processing, it is not sufficient to show that subjects did not rely upon the most apparent criteria, or the one used deliberately to set up the stimulus set. What must somehow also be ruled out is that judgment outcome patterns did not corroborate other, probably more complex feature relationships, especially those that were relied upon to create a family resemblance among learning phase instances of a category/s (i.e., multiple conjunctive features, or probabilistic associations). Since judgment outcome patterns in almost all cases might correspond to potential featural rules, the data from this paradigm is not likely to be entirely convincing for purposes of identifying categorization processes. Cohen and Basu (1987) have also raised some questions regarding the ecological validity of the findings generated by this paradigm. Consideration of the

contextual variables described earlier is important here. Real brands in the marketplace in all probability do not subscribe to the structural constraints characterizing artificially constructed stimuli (as are employed in the above methodology) in terms of the necessary relationships between features and instances for purposes of predicting judgment outcomes. Hence, exploring the range of categorization phenomenon and the suggested contingency framework might be problematic.

The Verification Accuracy Paradigm

Recognizing the types of shortcomings described above, Cohen and Basu (1987) have proposed a methodological framework (the Verification Accuracy paradigm) to examine different categorization processes. In our view, "the verification accuracy paradigm strives to differentiate between categorization processes in terms of observed variance in particular outcome traces of information processing activities of each" (p. 468). The guiding premise of the latter is as follows: categorization involves retrieval of information from memory for purposes of comparison with the to-be-classified target. Such retrieval should lead to enhanced memory for the information, post categorization, as a function of rehearsal or recency of memory activation. Since different categorization models differ with

respect to their assumptions regarding what sorts of stored information are employed in category judgment, it might be possible to identify the mechanisms by systematically examining the effect of a category assignment decision/s on the relative quality of retrieval (i.e., extent of recall, accuracy of verification, etc.) associated with different forms of category information (i.e., prototype, exemplar, etc.). Procedurally, the task remains similar to the category-judgment paradigm. That is, respondents initially acquire a category/s through presentation of exemplars, and subsequently categorize test items. The focus (i.e., critical dependent measures) shifts from consideration of the category assignment outcomes themselves to both qualitative and quantitative aspects of retrieval of exemplar information acquired in the learning phase (following instance assignment). Recall that exemplar-based nonanalytic processing involves retrieval of concrete instances from memory. Such a process should lead to a subsequent memory advantage (i.e., post categorization of a target) for <u>past instances</u> of the category (since these are utilized directly in categorizing new instances) when compared to rule-based processing. In the latter case, retrieval of a functionally autonomous set of criteria is assumed, without reference to specific instances. The above comparison, then, (i.e., in terms of memory for past instances) would form the basis for distinguishing between the two models,

assuming that respondents had equivalent initial training vis-a-vis the concept. Besides just the extent of retrieval, qualitative differences, i.e., with respect to specific types of aspects contained in past instances might also be made with respect to the above two models assuming certain retrieval task formats. Relying on an example described by Cohen and Basu (1987), say, an individual (following categorization of a new instance) was asked to verify whether or not a certain "luxury" feature had been included in a particular model (i.e., exemplar) of a previously encountered automobile. It appears that a number of mechanisms could be invoked in making such a verification judgment. For example, the individual could scan his/her memory in attempting to determine whether indeed the specific feature was associated with the exemplar in question. Alternatively, he/she could draw an inference based upon the perceived relationship between the aspect in question and the overall meaning ascribed to the category of membership of that instance. If the relationship is one of inconsistency (for example, the model is perceived as belonging in a category of cars labelled as "economy" types), then a category-based inference could lead to a rejection of the possibility that such a "luxury" feature had indeed been associated with the exemplar. Similarly, in the event a consistency relationship exists, an inference may be made in favor of the inclusion of the feature in the specific

exemplar. Such category-based inferences might lead to systematic biases in verification judgments, depending upon the actual presence or absence of consistent/inconsistent aspects in past exemplars of the category. If indeed an inconsistent feature had been associated with a specific past exemplar (e.g., power windows in a brand assigned to the class of economy cars), then a category-based judgment would lead to erroneous rejections of the association. Which of the above two mechanisms (i.e., memory retrieval or category-based inference) would dominate the verification response would seem to depend upon a number of factors, such as the strengths of the memory trace for the instance and the feature in question, the cue-validity or prototypicality of the latter, and the confidence associated with the prior classification of the instance. To the extent that an exemplar-based process activates past instances, individuals adopting the latter might be predicted to be more accurate in verifying the "inconsistent-associated" aspects described earlier, than rule-based analytic processors, whose poorer (relatively) memory for such instances might lead to more category-based inferences, and thus systematic inaccuracies as described earlier. A similar qualitative difference in verification might be posited for "consistent-unassociated" aspects of past exemplars. For the latter, category-based inferences would lead to affirmative verification judgments, when

indeed the aspects in question had been unassociated with the exemplar/s. Here, too, individuals who retrieve exemplars in their entirety might be predicted to be more accurate by virtue of their superior memory for the latter following categorization of a new instance. For the remaining, "inconsistent-unassociated" and "consistent-associated" aspects, even though memory advantages would seem to accrue to individuals employing exemplar retrieval in categorization over rule-based processors, the verification accuracy measure would probably not be sensitive enough to reflect meaningful differences. This is so because the two response mechanisms, i.e., memory based and category inference based, would lead to similar accurate verifications. In addition to the above-mentioned aspects, those features that are irrelevant for purposes of categorization of past instances, i.e., the idio-syncratic aspects of the latter might also provide a basis for discriminating between an exemplar retrieval and a rule-based process. Retrieving exemplars in their entirety (i.e., instant objects) should lead to enhanced memory for category-irrelevant aspects, and this might be reflected in terms of superior accuracy on the respective verification judgments. In summary, then, the verification-accuracy paradigm predicts that exemplar-based nonanalytic processing (i.e., which involves retrieval of past instances in their entirety and comparison on the basis of overall similarity relations) would lead to superior

accuracy over rule-based analytic processing in verifying aspects of past category exemplars that are (a) inconsistent with the category designation but the feature had indeed been associated with the exemplar; (b) consistent with the category designation, but the feature had not been associated with the exemplar, and (c) irrelevant for purposes of categorization of the past exemplar/s.

In addition to comparing between exemplar-nonanalytic and rule-analytic models, the paradigm is flexible enough to incorporate other comparisons through careful examination of the information processing assumptions of each model and appropriate choice of verification items. For example, if instead of being rule-analytic, an exemplar-analytic mechanism was adopted, i.e., involving aspect-by-aspect comparison between the target and a retrieved exemplar/s, then the model identification procedure (generally speaking) would involve the following: a verification set might be created that contains aspects of the referent exemplars that are both shared with the target instance, as well as those that are not in common between the two. While an exemplar-analytic process should lead to enhanced memory for the former, such should not be apparent for the latter aspects. Both the above types of verification aspects should benefit (memory-wise) from the adoption of an exemplar-nonanalytic process, while rule-analytic processes should fair worst among the three,

especially for the "inconsistent-true", "consistent-false", and "irrelevant" aspects.

The major advantage of the verification-accuracy paradigm over the category-judgment paradigm is that it allows one to differentiate between a larger set of potential processes. Also, in moving from purely "outcome"-based measures to those directed to the processes, it lends greater validity to model identification inferences. Since the tasks involved are almost identical (the verification accuracy paradigm includes a subsequent verification task), the two sets of measures can be collected within a single study. The entire pattern of these might then be examined to provide converging evidence in favor of, or to rule out specific processing mechanisms. The structure of the experiment necessary is also amenable to the study of contingent dimensions which might be manipulated either during category learning or category-judgment phases depending upon theoretical considerations. Since specifically structured stimuli sets are no longer mandatory, real categories of product brands might be featured, enhancing the confidence with which the findings may be incorporated in managerial decision making.

In spite of its attractive potential, the verification accuracy paradigm is yet to be examined in an empirical sense and questions remain unanswered regarding the strength, sensitivity, etc., of its measures. For example, it is not clear that if past

exemplars of a category are well learned (through repeated usage, or memorization in the learning phase of a study), then whether the memory advantage arising out of a single instance of exemplar retrieval (that during categorization of a test item) would be substantial enough to lead to significant accuracy differences. Also, if initial category learning is somehow nonequivalent among respondents, then the latter might be confounded with memory differences as a function of exemplar retrieval. Such learning differences might be accentuated if respondents in some conditions are also provided with rule information during category learning, potentially leading to selective attention towards rule-relevant aspects of the learning stimuli at the expense of aspects that might be viewed as unnecessary or "background." In addition to the focal verification accuracy measure, several supplementary indices might also be included in the framework. For example, respondents' reaction times to the verification aspects might be recorded and analyzed to ascertain whether or not memory enhancement patterns similar to the accuracy measure are obtained. Different categorization mechanisms might also be posited to differentially influence certain feeling states associated with the categorization and verification judgments. One example is a respondent's feeling of confidence in executing such judgments. As described by Cohen and Basu (1987),

> for a rule-analytic processor, confidence (i.e., in categorization) should be a function of prior expertise in rule usage and the relative ease with which the latter may be applied vis-a-vis a given stimulus set and in a given judgment setting. The extent of ambiguity of the target stimulus, perhaps with respect to the proportion of features it shares with the exemplars/prototypes from two or more alternative categories, should also lead to different feelings of confidence. For an exemplar-based and nonanalytic processor, confidence should be a function of the relative availability of past exemplars that are similar in an overall sense to the test item/s.
>
> (Cohen and Basu, 1987, p. 469).

Hence, it might be claimed that if the known featural rule for a category is structurally simple, and if the judgment setting does not unduly constrain analytic processing, then rule-analytic judgments will lead to greater feelings of confidence in categorization than exemplar-nonanalytic processes. The latter being simply less structured should invoke less confidence, unless exemplars that are retrieved are extreme in their overall similarity or dissimilarity to the target item. For verification confidence judgments the picture is less clear. While it might be claimed that confidence in verifying the presence or absence of specific aspects of past exemplars should be a function of the memorability of each specific aspect as well as their cue validities, and hence verification confidence predictions would

parallel those for verification accuracies (Cohen and Basu 1987), a different basis might be evoked here in making predictions. The role of category-based inference making and judgments has been examined in the literature (Lingle, Altom, and Medin 1984), and general findings corroborate the notion that individuals employ such a basis frequently and confidently in dealing with their environments. Given such ubiquitous nature of category-based judgments, the same in the context of verifications (as described above) would seem also to lead to fairly high confidence levels. In fact, it might be posited that, when rule-analytic processors perceive a consistency/inconsistency relationship between a verification feature and a category (i.e., to which the exemplar in question belongs), then their confidence in verification might exceed those experienced by exemplar-nonanalytic processors. This might be so because the latter (in attempting to retrieve specific features associated with particular exemplars) experience uncertainties. These might arise from, first, overlapping representations of a number of exemplars in memory. Such could be the case if the latter had been experienced contiguously in the past (e.g., neighbouring displays of brands in a store, etc.), or if they were highly similar in perceptual characteristics (e.g., similar package designs, etc.). Second, there might be uncertainties due to incomplete representations of particular exemplars, as a result

of decay of certain aspects. As Medin and Schaffer (1978) claim, such differential decays in exemplar representations could occur as a result of differences in the perceived importance of exemplar features over time. When verification features do not possess consistency/inconsistency relationships to the category, as described above, rule-analytic processors would be unable to employ the simple response heuristic. For such "category-irrelevant" features, then, exemplar-nonanalytic processors should exhibit superior confidence than rule-analytic processors, as a function of their enhanced memory for past exemplars.

An interesting covariate analysis that might be incorporated in the paradigm concerns the difference between past exemplars of a category in terms of their overall similarities to a target. Memory facilitation effects are predicted for exemplar-nonanalytic processes, but such should accrue only to those past instances that are actually retrieved during categorization. To the extent that a target probe retrieves a subset of past instances, only these should exhibit the memory enhancement effects described earlier. One could identify such selective enhancements through post-verification measures of overall similarity between a set of pairs, each involving the target and one of the category learning instances. Such measures and analyses can also begin to address the issues concerning choice among several exemplar models (i.e., "nearest neighbour," "best example," etc.) described earlier.

While self-reports of categorization processes are generally considered low in validity in terms of model identification, practical considerations might argue in favor of their inclusion, only after the above measures have been collected, without any significant logistic inconveniences. At the very least, they might expose procedural problems (e.g., unanticipated rule induction, etc.) as well as providing some additional evidence for or against specific mechanisms.

In summary, the verification-accuracy paradigm appears to be conceptually sound, and holds some potential to provide a more valid basis for identifying competing categorization models than that afforded by the category-judgment paradigm. Unfortunately, no published research has yet subjected the above to an empirical enquiry, and its strengths or limitations are unknown at this point. The empirical study conducted for this dissertation adopted the verification-accuracy paradigm with a view towards explicitly testing its predictions. The next chapter describes the hypotheses that were developed to suit such a purpose.

CHAPTER THREE

HYPOTHESIS

This chapter presents the hypotheses that emanate from the conceptual discussions of the previous chapter, and those that were subjected to empirical tests in this dissertation. We shall begin by delineating the focus of this investigation. Next, three sets of formal propositions will be advanced, each accompanied by some discussion relating to their conceptual bases.

While several models for categorization processes have been described in the literature major methodological problems prevent us from specifying each accurately in terms of fundamental assumptions, and thus from choosing among a set of alternatives in any given context. Primarily, classification outcome-based measures have been shown to be weak in identifying feature-based (both single as well as multiple cue) processes and potentially nonanalytic ones. The "verification"-based paradigm that was presented seemed to be conceptually robust, and if operationalized appropriately, to be able to capture real processing differences. Accordingly, the thrust of the empirical investigation was to discover whether or not this new paradigm was capable of capturing differences betwen competing

categorization models based on the information-processing assumptions embodied by each. It was believed that once a reliable and valid methodology was established, investigation of the contingent processing dimensions could proceed efficiently.

Given such a primarily methodological focus, i.e., to document different categorization strategies, a full-fledged inquiry into the potential influences of the contingent dimensions was not attempted. Instead, a limited set of factors, a) type of category knowledge, and b) form of the exemplars (i.e., picture or words) during category acquisition and judgment were investigated. The choice of the above variables was guided by our consideration of the "mixed" model. While consumers might differ from one another on a large number of dimensions, one that is of special importance in this context is the nature of category information possessed by a consumer/s. It was believed that consumers might possess different types of knowledge regarding a category (or a set of related ones) and that such knowledge might consist entirely of either concrete instances experienced in the past, or category-defining rules based on attributes. A combination of both exemplars and rules might also characterize a consumer's knowledge regarding a category. Such a distinction between types of category knowledge (i.e., exemplars only, rules only, or a combination) is a critical individual difference factor, i.e., an aspect that a particular consumer

brings to different judgment contexts. Given relatively neutral judgment settings, i.e., those that do not provoke certain types of processes exclusively, the type of category knowledge itself might determine which categorization mechanism is most compatible and hence adopted. To the extent that consumers in the real world possess different types of knowledge regarding categories (as a function of different learning histories, or even the nature of marketing activities in certain product categories) investigating its impact on adopted strategies was viewed as a worthwhile step.

In addition to the above, another distinction that was viewed as important is the form of the exemplar in memory. A significant extent of our experience with products/brands is formed either through direct interaction with the object, or through viewing pictorial displays (as in ads, packages in store windows, etc.). Learning about categories through such direct experience or sensory processing of pictures, was believed to lead to concrete representations of such entities, analogous to episodic memory traces. Category learning might also occur through a definitional process involving reading written descriptions about exemplars (as in catelogs and some other forms of advertising). Here, the task of comprehension of meaning might lead to reference to semantic memory, i.e., an internal structure of relatively abstract relationships. To the extent

that category learning might involve either of these two different forms of exemplars (i.e., pictures or words), and selectively rely on either episodic or semantic memory, the impact on an adopted categorization process could be substantial. In addition to the context of category acquisition, the form of the stimulus (i.e., to-be-categorized object), in the judgment context, might also have significant influence on the type of memory (i.e., concrete pictorial episodes, or relatively abstract semantic) that is utilized during categorization. Studying the picture-word difference (in exemplar presentation) was thus viewed as significant in understanding the role of both learning, and contextual factors in determining categorization mechanisms.

The "mixed model" view of categorization suggests that consumers might be flexible in adopting different categorization mechanisms. While the verification-based paradigm might be utilized to differentiate between a number of these, the current investigation focussed on two specific categorization models-- the exemplar-based nonanalytic and the feature-based analytic. Two principle considerations went into the above choice. First, the two seemed to reflect the most predominant modes of consumer categorization-- the feature-based analytic corresponding to effortful and deliberative, and the exemplar-based nonanalytic to incidental and intuitive classifications in most day-to-day settings. Focussing on these two, then, might enrich our

understanding of the full range of consumers' categorization strategies. Second, given the variety of feature-based models commonly advocated by consumer researchers, it was believed that it might be useful to document, in contrast, a structurally different mechanism that seemed intuitive and plausible. Also, such a nonanalytic exemplar-based process, if documented in plausible consumer settings, might have serious implications in terms of marketing practice, eg, in determining the nature of communication strategies that are likely to be successful. The investigation then, was directed towards a) documenting the two processes, in terms of the "verification"-based paradigm, and b) determining the nature of influence of two process-contingent dimensions.

In the following section, three sets of interrelated hypotheses will be presented. The first pertains to the exemplar-memorability aspects embodied in the verification paradigm; the second concerns additional process indices, while the third involves relationships between the contingent dimensions and the two categorization processes. Each set of hypotheses will be followed by a brief discussion of their rationale.

Hypotheses: Exemplar Memorability

H1: Exemplar-based nonanalytic processing will lead to greater memory for aspects of category exemplars experienced in the past than will rule-based analytic processing. Such a difference in exemplar memorability will be reflected in terms of the accuracy in accessing such aspects, and in the speed and confidence associated with such performance.

Corollary H1A: Memory enhancements arising out of exemplar-based nonanalytic processing will accrue to only those past exemplars of a category that are actually retrieved during categorization of an unfamiliar instance.

The exemplar memorability hypothesis was derived from the following premise: Exemplar-based nonanalytic processing involves retrieval of concrete past instances from memory during categorization of an unfamiliar instance. Rule-based analytic processing involves retrieval of an autonomous set of criteria. Thus, exemplar-based nonanalytic processing should lead to an enhancement in the memory traces of the past exemplars, as a function of recency of activation during categorization. Rule-based analytic processing, however, should not lead to similar enhancements. Such a memorability difference was believed to lead to significant differences on a number of measures related

to access of these past exemplars, after the category judgment on a new instance has been made. These would potentially include: a) the accuracy with which a past exemplar or an aspect therein is retrieved; b) the latency associated with such retrieval; c) an individual's feelings of confidence in retrieving and reporting on past exemplars. Although general memorability differences might be hypothesized between the two categorization models, exact manifestations of these need to take into account specific instruments and procedures utilized within any particular study. Specific predictions related to memory differences between the categorization models were made after consideration of the particular reporting instrument that was used. These will be presented in more detail under the section titled "Operational Predictions" in Chapter Four.

The corollary to H1 was advanced to further delineate the potential domain of memorability differences described earlier. It was believed that memory advantage (after the category judgment) arising out of exemplar-based nonanalytic processing will accrue only to those past exemplars of a category that were actually retrieved and compared to the unfamiliar instance during catgorization of the latter. That is, some degree of mental effort is presumed on the part of an individual, in the exemplar comparison process. The likelihood of such mental effort would seem to be inversely related to perceived similarity between the

target and a retrieved exemplar. This then eliminates from consideration exemplars that are perceived as extremely similar or dissimilar in an overall sense, to the to-be-catgorized instance. In the event of the former, categorization might be instantaneous and automatic, without significant effort in comparison, while in the latter, the past exemplar in question might not even be accessed. In either case, the basis for memorability differences, i.e., both retrieval and comparison of overall similarity, would be absent.

Hypotheses: Other Processing Indices

H2: When a to-be-categorized instance is seen as consistent/inconsistent with a previously-learned set of category-defining properties, then rule-based analytic processing will lead to faster and more confident category judgments than exemplar-based nonanalytic processing, provided highly similar or dissimilar (in an overall sense) past instances are not readily evoked.

H3: To the extent that executing a rule-based analytic process renders it available for introspection following a category judgment, it will lead to more accurate verbalization of the adopted strategy than exemplar-based nonanalytic processing.

Category judgments themselves were viewed as inadequate for demonstrating differences in categorization processes. The

speeds with which such judgments are executed, along with the associated confidences, were believed to be related systematically to the two mechanisms. With respect to H2, if an individual has available to him/her a structurally simple rule (i.e., one or two conjunctive features, etc.) learned previously, then on encountering a to-be-categorized instance, the latter will be applied analytically, unless aspects of the judgment context (e.g., perceived time pressure, distractions, etc.) dictate otherwise. Additionally, a rule-based analytic process under such circumstances was believed to lead to faster category judgments than an exemplar-based nonanalytic process. The rationale for hypothesizing such a difference was that rule-based analytic processing involves application of a limited set of well-learned operations, while the exemplar-based nonanalytic processing, being non-strategic in orientation, potentially involves retrieval of a number of past exemplars, for purposes of comparison. The latter, would not be true if a single or few extremely similar category exemplars were readily evoked in the judgment context. Further, using a rule was believed to connote to the individual a self-perception of having performed optimally, leading to greater confidence than processing by overall similarity, where the goal is often not optimality, but, rather achieving a satisfactory mental conclusion.

In addition, since a rule-based analytic process involves a piecemeal and somewhat systematic set of operations, upon

execution it would be more readily available for introspective accounts, than would an exemplar-based nonanalytic process, which was believed to be more spontaneous and intuitive than systematic (i.e., H3).

Hypotheses: Contingent Factors

H4: When category knowledge includes both exemplars and a feature-based rule, analytic processing will be more likely in the absence of guiding contextual factors.

H5: Presenting pictures of exemplars during category acquisition, as well as during categorization of new instances, will enhance the likelihood of exemplar-based nonanalytic processing. Presenting exemplars (during learning and judgment) through words will enhance the likelihood of rule-based analytic processing.

Hypothesis H4 was derived from our description of the "mixed model" for categorization (see Chapter Two) which views the adoption of specific categorization mechanisms as being a function of both characteristics of the individual and those of the judgment setting. In the absence of factors that provoke certain types of processes to the exclusion of others, the type of category knowledge that a consumer brings to a judgment

context might determine the nature of the adopted process. Specifically, when both category exemplars and a defining rule are available, rule-based analytic processing will be adopted, due to the perceived efficiency associated with such a process. When category knowledge is predominantly based on concrete instances, then exemplar-based nonanalytic processes will be relied upon unless the individual is alerted by aspects of the context to act otherwise (e.g., perceived requirements of high accuracy levels, etc., might dispose one to "search for" and apply rules analytically, even if such were unavailable to begin with).

The form of presentation of exemplars (i.e., pictures or words) was believed to influence categorization mechanisms. Both structural and process-related distinctions have been made in the literature, with respect to episodic and semantic systems in memory. The distinction has many facets, but chief among these is that a person's episodic memories are personal, autobiographical, and recapture the temporal and spatial context of his/her past experiences. It is often viewed as a recording tape on which ongoing experiences are imprinted as sensory experiences of objects, events, peoples, etc. Semantic memory, in contrast, contains a person's knowledge of the relations among words, and the rules or algorithms for manipulating words and symbols. To the extent category learning occurs through

experiencing pictures of exemplars, it should lead to distinct, graphical, episodic impressions in memory. Learning categories through words might involve greater reliance on semantic memory. Such might be the case for purposes of comprehending the meanings of the words and relating them to each other. Thus, learning a category/s through pictures was believed to create rich, distinctive episodic traces for the exemplars, and enhance the likelihood that such would be utilized for subsequent categorizations. Learning categories through words was believed to lead to greater likelihood of using generalized rules or relationships for categorization. In addition to the learning context, the picture-word distinction might also be significant with regard to the target (to-be-categorized) instance. Specifically, the most extreme form of reliance on exemplars, i.e., an exemplar-based nonanalytic process would occur, when pictures of specific instances are involved, both during learning as well as category judgment. That is, the target picture would cue specific episodic traces of past experiences, and an integral or holistic comparison process (similar to pattern matching in perception) would occur. If category learning involved words describing exemplars, and the target object was similarly presented, then rule-based analytic mechanisms would be most likely. There are other nuances to the above relationships. Differences between the forms of learning and to-be-categorized

instances, for example, would probably lead to somewhat different orientations than those described. That is, when learning occurs through pictures, but the judgment involves an instance described through words, then the adopted mechanism could be more analytic (e.g., comparing the target and a memory exemplar on the basis of shared features, etc.). In such a comparison process it is likely that the common denominator is features, unless there is the prior step of turning a verbal/written description into a "mind's eye" representation (i.e., images).

A critical aspect in relation to the above discussion is the role of "other contingencies" in the judgment context. Just as with the type of category knowledge (H4), the hypothesized relationships vis-a-vis the picture-word distinction, might be affected significantly, or even usurped, depending upon the nature of these other contingencies. For example, even if rich episodic traces of past exemplars are evoked by a pictorial target instance, specific task orientations in a given context might lead to more deliberate consideration of category-defining rules, and analytic categorization mechanisms might follow. Thus, both H4 and H5 are premised on the assumption that relatively "neutral" judgment contexts are available.

CHAPTER FOUR
METHOD AND PRETESTS

This chapter provides a description of the study that was conducted to test our hypotheses. The order of presentation of the discussion will be as follows a) an overview of the general orientation of the investigation; b) procedures, including an overview, followed by a description of the specific stages of the experiment; c) subjects; d) four individual studies, each including the relevant manipulations, stimuli, pretest procedures and results, and the dependent measures and operational predictions; e) the overall experimental design framework; and f) concluding comments on the methodology.

The study was designed as a first step, albeit a crucial one, in developing a reliable and valid paradigm to identify specific categorization mechanisms. Specifically, the objective was to determine whether or not an exemplar-based nonanalytic process could be identified in contrast to rule-based analytic mechanisms using the relationships derived from the "verification"-based paradigm. A secondary focus was to delineate relationships between some selected contingent dimensions and the above-mentioned categorization models. Since only a limited set of contingencies were manipulated in this

study the latter is unlikely to provide guidance regarding some conditions under which the various categorization mechanisms are likely to be used. The primary emphasis of the study endowed it with characteristics of a "theory-testing" experiment (Calder, Phillips and Tybout 1981). Thus, internal validity and construct validity considerations were viewed as paramount in alternative selections (i.e., in operationalizations, procedures and controls). Besides being the first known attempt to adopt the verification paradigm in research on categorization processes, the study was also viewed as a departure from previous work in that prior research, largely in the area of cognitive psychology has relied on artificial categories (i.e., geometric forms, etc.). The critical difference between such artificial categories and consumer product classes is that the latter are often inherently evaluative. Additionally, in using real product classes the investigation was believed to be more focused on the domain of our immediate interest. The next section provides an overview of the methodology.

Overview

The investigation consisted of four individual studies, each directed at assessing all three sets of hypotheses described in Chapter Three, albeit using different categories of products.

All four studies were embedded within a single set of procedures and utilized a common group of subjects. In addition to testing the three sets of hypotheses, each study was also designed to provide an assessment of the category-judgement paradigm in comparison with the verification paradigm. The category-judgement paradigm is premised on the notion that adoption of different categorization mechanisms would lead to differences in category assignments of a set of previously unfamiliar (to-be-categorized) instances. Procedurally, the latter may be assessed by a) creating stimuli that reflect particular configurations of properties, and b) analyzing the category judgements themselves to ascertain whether or not predicted patterns are observed. In each of the four studies, stimuli were chosen such that specific category-judgement predictions could be made and compared to observed outcomes. These will be presented in detail in the description of each study.

The four product categories used in the study were: department stores, vacation tours, alcoholic beverages, and residential homes. Table 4-1 provides an overview of the four studies in terms of their respective natures and objectives. The specific hypotheses and predictions shown will be discussed in subsequent sections. The four product categories were chosen to provide a range, in terms of subjects' prior category information. In utilizing real product categories, it was

Table 4-1

Overview of the Four Studies

Study	Product Class	Prior Familiarity with Exemplars and/or Knowledge of Rules	Presentation Form of Exemplars	Verification Paradigm	Other Processing Indices	Category Judgment Paradigm	Contingent Dimensions
1	Department Store	High	Pictures	Exemplar memorability differences as evidenced in verification accuracy, confidence and latency on a set of six features associated with each category learning exemplar	Differences in categorization performance (confidence and latency) and and verbalizations associated with a set of two test (to-be-categorized)	Differences in category assignment of a set of two test instances, between rule-analytic and exemplar-nonanalytic mechanisms	Differences in processing between rule-analytic, and exemplar-nonanalytic mechanisms, due to difference in type of category knowledge and presentation form of instances
2	Vacation	Low	Words	Exemplar memorability differences as evidenced in verification accuracy, confidence and latency on a set of six features associated with each category learning exemplar	Differences in categorization performance (confidence and latency) and verbilizations associated with a set of two test (to-be-categorized) instances	Differences in category assignment of a set of two test instances, between rule-analytic and exemplar-nonanalytic mechanisms	Differences in processing between rule-analytic, and exemplar-nonanalytic mechanisms, due to difference in type of category knowledge and presentation form of instances
3	Alcoholic Beverages	Moderate	Pictures	Exemplar memorability differences as evidenced in verification accuracy, confidence and latency on a set of two features associated with each category learning exemplar	Differences in categorization performance (confidence and latency) and verbalizations associated with a set of two test (to-be-categorized) instances	Differences in category assignment of a set of two test instances, between rule-analytic and exemplar-nonanalytic mechanisms	Differences in processing between rule-analytic, and exemplar-nonanalytic mechanisms, due to difference in type of category knowledge and presentation form of instances
4	Residential Homes	Moderate	Pictures	Exemplar memorability differences as evidenced in verification accuracy, confidence and latency on a set of two features associated with each category learning exemplar	Differences in categorization performance (confidence and latency) and verbalizations associated with a set of two test (to-be-categorized) instances	Differences in category assignment of a set of two test instances, between rule-analytic and exemplar-nonanalytic mechanisms	Differences in processing between rule-analytic, and exemplar-nonanalytic mechanisms, due to difference in type of category knowledge and presentation form of instances

recognized that experimental subjects would possess varying types of prior knowledge regarding these. Such prior knowledge, over and above that acquired during the study might determine the nature of observed responses. Specifically, the extent of exemplar and/or rule representations that subjects might have regarding these categories, prior to the study, was considered to be a critical factor. Even though no formal procedures were adopted to identify specific product categories with different exemplar and/or rule characteristics among the target respondents, the following characterization was arrived at intuitively: undergraduate students (our subjects) were believed to be fairly familiar with department stores, i.e., possess a large number of past exemplars in addition to defining rules (attribute based) with respect to different "types" of stores. The respondents were believed to have few exemplars and rules for vacation tours. An intermediate level of both number of exemplars and extent of rule formulation was expected for both the alcoholic beverages and residential homes categories. Thus, instead of serving as complete replications, the intuitive choice of the four categories based on the described criteria led to an apriori conceptual basis for expecting differences in results between these.

Procedure

Overview

All subjects for the experiment were administered the study individually. The procedures consisted of three common stages. In the first, the learning phase, subjects were informed about the four categories (vacation tours, department stores, alcoholic beverages, houses). The type of category knowledge (i.e., exemplars only, versus exemplars plus rules) was manipulated randomly between subjects at this stage. Next, in the categorization phase all subjects were exposed to new instances from each of the categories learned previously and, following exposure to this entire set asked to make categorization judgements with respect to each of the novel instances, i.e., whether or not each would qualify as a member of the respective category learned in the previous phase. Finally, in the response phase, all subjects were administered a set of questions pertaining to the various indices of memorability for exemplars encountered in the learning phase along with other dependent measures. The same individual conducted each of the sessions that ran for about 35-40 minutes. Table 4-2 shows the experimental procedure in schematic form.

Table 4-2

Experimental Procedure

Phase	RBG[a]	EBG[b]
Learning	1. Introduction with cover story	1. Introduction with cover story
	2. Learning of category exemplars and rules	2. Learning of category exemplars
Categorization	3. Exposure to unfamiliar (to be categorized) stimuli	3. Exposure to unfamiliar (to be categorized) stimuli
	4. Categorization judgements	4. Categorization judgements
Response	5. Verification and related judgements	5. Verification and related judgements
	6. Self reports	6. Self reports
	7. Additional data	7. Additional data

a -- RBG -- rule-based group (exposed to exemplars plus rules for all the categories)

b -- EBG-- exemplar-based group (exposed to exemplars of the categories only)

Learning Phase

At the beginning of each session a subject was randomly assigned to either of two conditions: the exemplar-based group (EBG), and the rule-based group (RBG), corresponding to the specific type of category knowledge manipulation that would be administered during the learning phase. The subject was seated in front of a computer terminal and asked to respond in terms of the information presented on the screen. All the subjects, regardless of the EBG/RBG manipulation, were first shown a series of twelve slides. Three specific offerings or brands from each of four product classes were introduced as examples of ads that are normally viewed as part of television programming. Timing of each slide was externally controlled; 45 seconds for ads with words only and 30 seconds for those with pictures only. Operating instructions for the keyboard were also presented at this time. Following exposure to the series of category-learning items, all subjects were informed that each of the twelve brands seen in the ads belonged in one of four categories. These were categories of acceptable brands for four specific individuals. For example, they were informed that the three travel ads that they saw had been preferred by a certain individual (Mr. Jones); all the three department stores shown were preferred by a Mrs. Smith; the three alcohol ads were preferred by a Mrs. Baker; and

the three houses were preferred by a Mr. Dickson. Thus all subjects were introduced to four sub-categories within the four general product classes. These sub-categories, i.e., categories of brands preferred by the four distinct individuals (hereafter acceptance categories) and not the generic classes themselves, comprised the categories of interest in this study (i.e., those that were referred to in subsequent phases). The reason for employing such acceptance categories was that previous studies on categorization typically involved informing respondents about two or more contrasting categories of instances (e.g., two sub-categories within a general class). Subsequently, subjects were asked to classify novel stimuli in terms of such learned sub-categories, i.e., as a member of one or the other. Presenting such contrasting sub-categories during acquisition might, however, lead to discrimination learning on the part of respondents. That is, attention might be drawn towards features that distinguish between such sub-categories and this might lead to formulation of rules and usage of the same in future classifications. For the purpose of this experiment such rule induction during learning was unwanted for both the RBG and the EBG. Hence, a single category (i.e., the acceptance category) was presented for each of the four product classes. This way, subjects would learn exemplars from each category in an in-depth fashion without attempting to develop rules for discrimination.

Also, the requirements for providing referrent categories (i.e., that to which unfamiliar instances need to be compared) would be adequately met.

The EBG subjects received no further instruction and proceeded to the next phase. The RBG subjects, however, were in addition informed that each of these acceptance categories was associated with a particular decision rule which the respective individual usually invoked in coming up with a preference judgment (e.g., Mr. Jones prefers vacations that have more "personal enrichment" oriented features than features oriented towards "relaxation," etc.). After learning each of the four decision rules, RBG subjects were asked to write down their understanding of the rules. The rule-learning exercise on the part of RBG subjects (including self-timed reading of the rule, plus writing it down) took approximately 1-1/2 to 2 minutes per category on the average. Thus RBG subjects on average spent about 5-6 additional minutes at this phase than did the EBG subjects.

Categorization Phase

All subjects were informed that they were about to see a few more ads and were then shown eight new instances (two from each of the four classes seen before). At the end of the

sequence they were asked to judge whether or not each of the eight new instances would fall into their respective acceptance categories (e.g., whether or not the Mexico trip that they saw in this phase would fit into Mr. Jones' preferred set of tours, etc.). They were also asked to express their confidence in each of the above judgments.

Response Phase

All subjects responded to the same post-categorization questionnaire. The first set of questions pertained to the set of exemplars encountered in the learning phase of the study. Subjects were asked to verify (i.e., respond YES/NO) a set of forty-eight questions pertaining to specific features of the twelve learning phase exemplars. They were then asked to express their level of confidence associated with each of the verification judgments. Next, subjects were asked to judge the overall similarity between each of the target (i.e., to-be-categorized) instances and each learning exemplar from that respective category. Twenty-four such similarity judgments were obtained. Using a written questionnaire, subjects then described their categorization strategies for each of the eight new instances encountered in the categorization phase. Finally, subjects expressed their level of prior familiarity with each of

the four product classes utilized in the experiment and answered a twelve item processing style questionnaire.

Subjects

One-hundred-and-sixty undergraduate Business Administration students at the University of Florida participated in the study as partial fulfillment of course requirements.

The Four Studies

Study 1: Department Stores

As described earlier, the choice of department stores as a general product class for purposes of this study was guided by consideration of the possible nature of preexisting category knowledge among our target respondents. Specifically, members of our subject pool (undergraduate business majors) were believed to possess fairly large numbers of concrete instances of department stores in memory. In addition, it was believed that respondents also possessed fairly well formulated attribute-based rules within this general class as a function of frequent interactions (i.e., rules regarding different "types" of stores, e.g., discount versus upscale, etc.). Thus, it was recognized that primes in the categorization context might lead to retrieval of

such preexisting exemplars or rules in addition to what was acquired in the course of the study.

Category knowledge manipulation

The category knowledge manipulation consisted of providing respondents in the RBG with a feature-based rule for the acceptance category. Specifically, respondents in this group were informed (after exposure to the series of learning-phase exemplars) that the individual associated with this category, i.e., Mrs. Smith preferred to shop in department stores that possessed both of the following features a) carried merchandise which were extremely high in quality, and b) provided an exclusive shopping environment. The choice of this particular rule was guided by our intuitive consideration of how individuals might view different types of stores. It was believed that one possible classification for stores might consist of two sub-categories, those that are classy, expensive, and elegant, and others that carry lower priced merchandise in functional settings. Individuals seem to be able to relate to such distinctions almost intuitively while more specific feature-based characterizations for each of these, similar to that described above, might also be available. Respondents in the EBG were not provided with such a rule.

Stimuli

All the exemplars in this study were presented through pictures. For purposes of identification, each exemplar (both learning and to-be-categorized) depicted different merchandise sections (i.e., women's shoes, jewelry, etc.). Choice of specific exemplars in the two phases was guided by our objective of operationalizing the category-judgment paradigm. Specifically, the following conditions were sought a) exemplars encountered in the learning phase should be viewed as consistent with the category-defining rule described above; b) the three learning exemplars should be perceived as "somewhat similar" in an overall sense to one another; c) the two target (to-be-categorized) instances as a set should be categorized differently (i.e., in terms of membership in the acceptance category) on adoption of the learned category rule, on the one hand, and exemplar-based overall similarity relationships on the other. The rationale for condition a) was that respondents should be able to perceive the exemplars encountered in the learning phase as being members of a single category. That is, on thinking back about the learning phase exemplars, the RBG subjects would be able to see that indeed each of these subscribed to the rule. Also, moderate levels of overall similarity (i.e., condition b) between these stores would communicate to the EBG an intuitive

sense for the category of preference of Mrs. Smith. Extremely high levels of overall similarity between the learning exemplars was not sought. The reason for this is it was believed that these exemplars should also be distinctive such that they might be selectively retrieved based on their respective similarities to the test instances. Condition c) was necessary to set up the basis for obtaining differences in category judgment as a result of the two categorization mechanisms and hence identify their occurance. Such specifically structured learning and test exemplars (i.e., in terms of their rule-based and overall similarity properties) were only utilized to verify if indeed different categorization mechanisms could be observed in the study. Substantive conclusions regarding these test instances, i.e., how they might be actually classified by consumers in reality was beyond the scope of this investigation. Thus, a configuration of exemplars as in Tables 4-3 and 4-4 was sought.

Table 4-3 shows the desired similarity properties of the three learning-phase exemplars. Different merchandise sections were depicted to create distinct identities for each of these. It was required that the three stores be perceived to be somewhat similar to one another in an overall sense and that each be viewed as consistent with the category-defining rule learned by the RBG. Table 4-4 shows the similarity matrix for the two test (to-be-categorized) instances. To reiterate, the objective here

Table 4-3

Study 1: Desired Stimulus Configuration for Learning Exemplars

Exemplar	Similarity Properties	
	Rule Properties	Overall Similarity Properties
LE1	Consistent with the category rule	Intermediate level of overall similarity with the other two (i.e., LE2, LE3)
LE2	Consistent with the category rule	Intermediate level of overall similarity with the other two (i.e., LE1, LE3)
LE3	Consistent with the category rule	Intermediate level of overall similarity with the other two (i.e., LE1, LE2)

LE1 -- learning phase exemplar 1 (identification: shoe department)
LE2 -- learning phase exemplar 2 (identification: women's dress department)
LE3 -- learning phase exemplar 3 (identification: jewelry department)

Table 4-4

Study 1: Desired Stimulus Configuration for Test Instances

Overall Similarity	Rule-Based Similarity: High	Medium	Low
High		TI1	
Medium		TI2	
Low			

TI1 -- test (to-be-categorized) instance 1 (identification: cosmetics department)
TI2 -- test (to-be-categorized) instance 2 (identification: antique department)

was to have instances that on application of the rule would lead to different similarity judgments (vis-a-vis the acceptance category) than that by exemplar-based overall similarity mechanisms. Such a difference in category judgment could occur for one or both the test instances. In Table 4-4, test instance 1 (TI1) is positioned as being a store that would be viewed as extremely similar to the learning exemplars in an overall sense. The same store would be viewed only as moderately similar (and thus ambiguous in terms of its membership in the acceptance category) on use of the learned rule. Test instance 2 would be viewed to be similarly ambiguous due to its moderate level of similarity on both accounts. Thus, if respondents judge TI1 and TI2 both as being ambiguous in terms of their membership in the acceptance category, then rule-based analytic processing had probably been relied upon. If TI1 is judged to be similar and TI2 as ambiguous, then exemplar-based nonanalytic processes were probably adopted. There was no conceptual rationale in determining which test instance should be viewed as similar/dissimilar using either of the mechanisms. The only consideration was that at least one of these should be viewed differently. Thus, choice of the similarity conditions (i.e., position of TI1 and TI1 in the 3x3 matrix shown in Table 4-4) was constrained such that both the instances could not lie in the High-High, Medium-Medium and Low-Low cells. Besides this, their

positions were arrived at arbitrarily and varied from one study to the next.

It was believed that the verification features, i.e., features from each of the three learning exemplars (LE1, LE2, LE3) for inclusion in the verification set (see "Response Phase"), should be somewhat salient in themselves. The rationale for the above was as follows: if a particular feature of an exemplar is extremely low in salience (i.e., insignificant, with respect to the general description), then memory for the latter might not have an opportunity for significant enhancement even when the exemplar in question is retrieved during classification of the test instances. If the aspect in question is extremely salient perpetually, then regardless of whether or not that exemplar had additionally been retrieved during categorization access to the aspect might be fairly appreciable on the part of all subjects. In other words, to avoid "floor" or "ceiling" effects that might render the verification index insensitive to exemplar retrieval phenomena, only those aspects that possess intermediate levels of salience should be chosen for the study.

Pretests

Pretest 1: rule-based similarity of learning exemplars. The objective of this pretest was to determine whether or not the

three learning-phase exemplars chosen for the study were perceived as consistent with the category-defining rule.

Twenty subjects were informed of the category-defining rule at the beginning of the pretest. Specifically, they were told that they would see pictures for various department store interiors. Such stores could be classified as being either "exclusive" or "mass-oriented". The "exclusive" stores consisted of both the following properties a) stocked merchandise that were extremely high in quality; b) provide an exclusive shopping environment. The "mass-oriented" stores displayed relatively inexpensive merchandise in functional settings. They were next shown slides of the three learning-phase exemplars and asked to judge each one of them as being either "exclusive" or "mass-oriented" applying the learned rule.

Table 4-5 shows the results of Pretest 1. As shown, all the three stores were viewed as being exclusive, i.e., consistent with the category-defining rule. This was a desired condition for the learning stimuli (see Condition a).

Pretest 2: overall similarity of learning exemplars. The objective of this pretest was to determine whether or not the three learning exemplars were perceived as being somewhat similar in an overall sense to one another.

Twenty subjects were shown the three learning exemplars, following which they were asked to determine the overall

Table 4-5

Study 1, Pretest 1: Rule-Based Similarity of Learning Exemplars

Experimental Phase	Exemplar	Mean Rating[a]	Variance	Remarks
Learning	Women's Dresses	2.22	1.20	Consistent with the rule, as desired
	Jewelry	1.69	0.71	Consistent with the rule, as desired
	Women's Shoes	3.00	1.43	Consistent with the rule, as desired

a -- the following scale embodying the category defining rule was used:

1 2 3 4 5 6 7 8 9

Highly Exclusive — Somewhat Exclusive and Somewhat Mass-Oriented — Entirely Mass Oriented

similarities between them in a pairwise fashion. No rule information was provided within the procedure.

Table 4-6 shows the results of Pretest 2. As is evident, each of the three stores were generally perceived to be somewhat similar to the other two. The shoes exemplar, however, was seen as quite similar to the jewelry exemplar (as evidenced by 39% of responses in the highly similar category). Also, a rather high percentage (42%) viewed the dresses and jewelry exemplars as being dissimilar. While the above two percentages were seen as somewhat extreme in terms of our stimulus requirements (condition b) the set as a whole was deemed acceptable. This is so because the exemplars were viewed generally as being similar to each other (thus communicating the sense of being members of the same category), yet distinct enough to allow individual consideration.

Pretest 3: rule and overall similarity of test instances. The objective of this pretest was to determine whether or not the two test instances chosen for the study satisfied the rule and overall similarity properties depicted in Table 4-4. Specifically, the objective was to ensure that indeed test instance 1 was perceived as being high in overall similarity to the three learning-phase exemplars and only moderately consistent with the category-defining rule. Similarly, the objective was to determine if test instance 2 was viewed as only moderately

Table 4-6

Study 1, Pretest 2: Overall Similarity of Learning Exemplars

	Women's Shoes			Women's Dresses			Jewelry			Remarks
	HS	SS	NS	HS	SS	NS	HS	SS	NS	
Women's Shoes				22	45	33	39	44	17[a]	Somewhat similar to the other two, as desired.
Women's Dresses	22	45	33				11	47	42	Somewhat similar to the other two, as desired. However, greater difference with jewelry than shoes exemplar.
Jewelry	39	44	17	11	47	42				Somewhat similar to the other two, as desired. However, greater difference with dresses than shoes exemplar.

HS -- highly similar in an overall sense
SS -- somewhat similar in an overall sense
NS -- not at all similar in an overall sense

a -- percentage of total responses in this category

similar to the acceptance category by both rule and overall similarity relations (see Table 4-4).

First, similar to the procedures of Pretest 1, a different group of twenty subjects were informed of the category-defining rule, shown the two test instances and asked to make rule-based classifications. Next, a separate group of twenty subjects, was led through procedures similar to that of Pretest 2. That is, subjects were shown the five store exemplars (three from the learning phase, plus the two test instances) and asked to make pairwise overall similarity comparisons between each test instance and each of the three learning exemplars.

Tables 4-7 and 4-8 show the results of Pretest 3. As shown in Table 4-7, pretest subjects viewed both TI1 and TI2 as being "somewhat exclusive and somewhat mass-oriented" (P value of difference between TI1 and TI2 = .68). Thus, they might be viewed as ambiguous in terms of membership in the acceptance category as per the rule. Looking at Table 4-8, it appears that TI1 was viewed as similar to the learning exemplars (almost by 70%-30%, combining the HS and SS categories and comparing to the NS category). TI2, however, generated almost equal percentages of similar (HS and SS combined) and dissimilar judgements. Thus, both these test instances seemed to have satisfied the rule and overall similarity properties set forth earlier (Table 4-4) to allow differential predictions of category judgments.

Table 4-7

Study 1, Pretest 3: Rule Similarity Properties of Test Instances

Experimental Phase	Exemplar	Mean Rating[a]	Variance	Remarks
Categorization	Cosmetics (TI1)	5.15	3.10	Neither similar nor dissimilar to the acceptance category, as desired.
	Antiques (TI2)	5.38	2.75	Neither similar nor dissimilar to the acceptance category, as desired.

TI1 -- test instance 1
TI2 -- test instance 2

a -- the following scale embodying the category defining rule was used:

1 2 3 4 5 6 7 8 9

Highly Exclusive — Somewhat Exclusive and Somewhat Mass-Oriented — Entire Mass-Oriented

Table 4-8

Study 1, Pretest 3: Overall Similarity Properties of Test Instances

Test Instance	Women's Shoes			Women's Dresses			Jewelry			Remarks
	HS	SS	NS	HS	SS	NS	HS	SS	NS	
Cosmetics (TI1)	22	44	33	10	58	32	21	47	32*	Generally high similarity to learning set, as desired.
Antiques (TI2)	11	43	46	5	45	50	11	40	49	Ambiguous in terms of its similarity to learning set, as desired.

HS -- highly similar in an overall sense
SS -- somewhat similar in an overall sense
NS -- not at all similar in an overall sense

* percentage of responses in this category

Pretest 4: alternative feature-based rules. In selecting the learning and test exemplars (as in the above) it was apparent that several features of these exemplars were quite salient. The latter included those involved in the chosen category-defining rule, i.e., the level of "exclusiveness" of the environment and the relative expense level of the merchandise. Some other features were considered to be salient enough to be selectively retrieved by respondents. Appreciation of this led to the following concern: if a single or few salient features (other than those included in the rule) were associated with the store exemplars (both learning and categorization phase) in some systematic fashion, then respondents might discover and use such a relationship in categorizing the target instances. A simple example of this would be if all three learning exemplars possessed a single highly salient feature, then subjects might abstract this as the basis for category membership (i.e., Mrs. Smith prefers stores that possess such a feature). The categorization decisions might then be based on whether or not the test instances possessed that feature. Such a feature-based analytic strategy might be adopted by both groups of respondents. The salience of the feature and the obvious similarity of the exemplars might lead the EBG to induce such a "rule." The RBG might also adopt such a rule if it seemed easier to use than the learned rule. In both events, category judgements of the test

instances might be different from those described earlier, since a rule-based similarity relationship different from that depicted in the matrix (Table 4-4) would govern these judgments. This, then, would prevent us from predicting and validating unique categorization mechanisms, and render assessment of the category-judgment paradigm problematic.

First, it was necessary to assess the extent and ways by which the exemplars (learning and test) might potentially be characterized by "alternative rules" based on salient features. Following this, efforts were made to remove obvious relationships (e.g., similarity of exemplars on a single salient dimension, etc.). Finally, it was decided that candidate rules would be identified and their impact on categorization of the two instances would be traced through.

The procedure for the above involved, first, showing all the five store slides to a group of twenty subjects. Following this exposure they were asked to write down all features or aspects of each exemplar which readily came to mind. A list of salient features (i.e., those mentioned most frequently) was created. Next, a different group of twenty subjects were again shown the same five slides and asked to determine to what extent each of the stores possessed each of the features on the list. Results from this procedure were used to create profiles for the exemplars (Table 4-9). Finally, category-judgment predictions

Table 4-9

Study 1, Pretest 4: Alternative Rules

	Features					
Learning Exemplars	F1	F2	F3	F4	F5	F6
Women's Shoes	1	1	1	1	2	0
Jewelry	1	1	1	1	1	2
Women's Dresses	1	0	1	0	0	0
Test Instances						
Cosmetics	2	2	0	0	1	1
Antiques	2	2	0	0	1	1

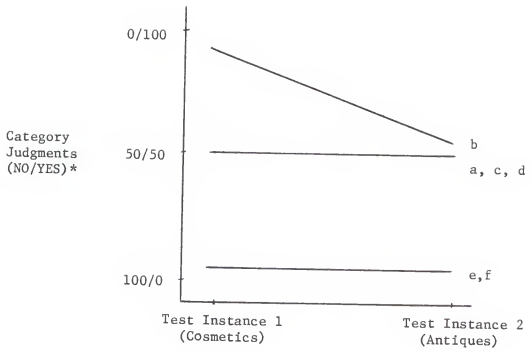
F1 -- expensive
F2 -- modern
F3 -- formal
F4 -- elegant
F5 -- spacious
F6 -- bright

1/2/0 -- subjects' response as to the extent each exemplar possessed the feature in question

1 -- yes
2 -- somewhat
0 -- no

(vis-a-vis the acceptance category) were made for the two test instances based on potential rule abstractions (Figure 4-1).

As shown in Table 4-9, six features were considered to be high in salience across the five exemplars. A number of single-cue rules could be formulated using such features, some that are based on criterial relationships (i.e., all the learning exemplars possess the feature), and others based on characteristic features (i.e., a certain level of a feature is more common among the members of the learning set). Based on such, four distinct single-cue models (c-f, Figure 4-1) were identified. Two of these, e and d, would lead to predictions indistinguishable from that based on the categorization rule learned by the RBG given the rule properties of the test instances established through Pretest 3. That is, if subjects considered the acceptance category to be best described by the characteristic value on F2 (majority of stores preferred by Mrs. Smith appeared to be quite modern), then they might similarly judge the two test stores (somewhat modern) to be ambiguous. While this exercise failed to provide us with a set of predictions each unique with respect to specific models, the present set of exemplars were retained for the study. The reasons for such a decision were, it seemed that a) the exemplar-based overall similarity model might lead to judgments distinct from a number of other rule-based analytic models affording us



---

* NO/YES -- proportion of nonacceptance/acceptance judgments in terms of learning set (i.e., whether or not the test instance would be preferred by Mrs. Smith)

a -- analytical, based on categorization rule communicated to the RBG subjects

b -- exemplar overall-similarity based nonanalytic process

c -- analytic process based on criterial value on F1 (1)

d -- analytic process based on characteristics value on F2 (1)

e -- analytic process based on characteristic value on F4 (1)

f -- analytic process based on characteristic value on F6 (0)

Figure 4-1

Study 1: Category Judgment Predictions Based on Alternative Models

the opportunity of identifying two distinct categorization mechanisms; and b) specific information was now available regarding judgment outcomes of alternative feature-based models for purposes of comparison and inference. The problem that remained was that if one observed a category assignment pattern as in a, c, or d (Figure 4-1), it would be difficult to ascribe the latter to unambiguously to the learned category rule.

Pretest 5: relative salience of verification aspects. The objective here was to determine whether or not the features of the learning exemplars to be included in the verification set were each "moderately salient" in themselves.

Procedures involved showing the three learning exemplars to a group of twenty subjects. Following this, subjects were asked to verify (i.e., respond YES/NO) a set that included different features from each of the three exemplars. Next, percentages of accurate responses were determined. In lieu of prior research information on appropriate cut-off levels signifying extremely high or low levels of salience, these were arrived at arbitrarily. Features that showed accuracies below 55% or over 80% were dropped from the list (since these were believed to be either far too insignificant, or extremely central to the exemplar, so that all subjects, regardless of whether in EBG or RBG would perform equivalently on these). The rest (Table 4-10)

Table 4-10

Study, Pretest 5: Relative Salience of Verification Aspects

Learning Exemplar	Question Type: Consistent		Inconsistent		Irrelevant	
	True	False	True	False	True	False
Women's Shoes	68%[a]	60%	69%	80%	59%	66%
Women's Dresses	75%	55%	69%	79%	64%	55%
Jewelry	78%	68%	62%	78%	60%	72%

a -- percentage of accurate verification of this feature

were believed to be moderate in salience and hence appropriate for purposes of reflecting exemplar retrieval effects. An additional constraint that determined the choice of specific verification features was their relationship to the acceptance category (i.e., category consistent/inconsistent/irrelevant, and true/false). The rationale for such a criterion will be discussed in the section on dependent measures and operational predictions.

Instructions and questionnaire for each of the pretests is included in Appendix A.

Dependent measures and operational predictions

In the following section, the specific operationalizations that were employed to test the hypotheses will be presented. As described earlier, each of the four studies were similar in terms of design and operational characteristics. The latter will therefore be discussed in-depth with reference to study 1 and referenced in the remaining studies. We shall begin by describing the measures and predictions related to each of the hypotheses.

H1: exemplar memorability. The two groups of respondents were expected to adopt different categorization mechanisms,

leading to differential memory for the three learning exemplars. Specifically, the EBG was believed to have a greater likelihood of adopting exemplar-based nonanalytic processing in categorizing the two test instances. The RBG was expected to adopt rule-based analytic processing. This would be so because, when respondents possessed both rule and exemplar knowledge for a category, then there would be greater likelihood of rule usage (i.e., analytic processing) because of the perceived ease, efficiency and salience associated with the same. This would be particularly so when the judgment context was relatively neutral (i.e., free of time pressures, distractions, etc.), and the rule in question was simple to use. It was believed that the judgment environment in the study and the nature of the rule communicated to the RBG satisfied the above conditions. The EBG was expected to adopt exemplar-based nonanalytic processing because the categorization phase of the study did not attempt to induce specific goal orientations (e.g., perceived pressures for accuracy, high risk of misjudgment, etc.). Hence, relying on learned exemplars for categorization would seem to be intuitive and spontaneous. In addition to perceiving that using the rule would be the most efficient way to categorize, subjects in the RBG might also feel that use of the rule was somehow mandated given the effort spent in learning the same. Such a basis for adopting rule-analytic processing would then be akin to an experimental artifact. The

latter, however, did not appear to be a problem in view of the primary focus of the study.

To recapitulate, the objective was to determine whether the proposed verification-based methodology was indeed capable of capturing real differences in consumers' categorization processes. More specifically, the interest was to determine whether a non analytic process could be identified in contrast to common feature-based analytic mechanisms. The latter (in terms of its effects on the conceptual dependent measures) was thus viewed as a "bench mark," departures from which in the predicted directions would provide evidence for exemplar-based nonanalytic processing. Thus, feature-based analytic processing was indeed anticipated in the RBG condition. RBG subjects were not directly asked to apply the rule because our secondary objective was to obtain limited knowledge regarding the contingency framework.[1]

Even though exemplar-based nonanalytic processors (i.e., the EBG) were believed to possess stronger memory traces for past exemplars than rule-based analytic processors (i.e., the RBG) following categorizations, the specifics of the memory-access measure were believed to play a significant role. The study used

---

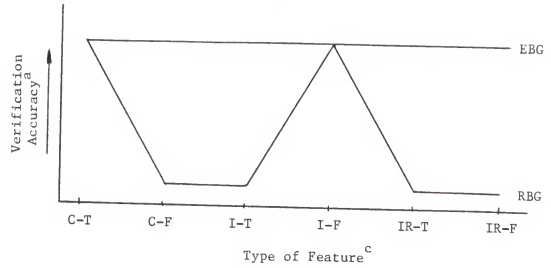
1. Alternative procedures to allay any demand effects (which may be important when research emphasis shifts from discovering the appropriate methodology, to understanding contextual factors) might include inducing delays between rule learning and categorization to prevent potential short-ranged priming effects.

a verification measure in which subjects were asked to respond to a set of questions. Each of these involved judging whether or not a specific feature was associated with a specific past exemplar. As claimed by hypothesis H1, the EBG should demonstrate greater accuracy in verifying these features than the RBG (see extended discussion for rationale, in Chapter Two).

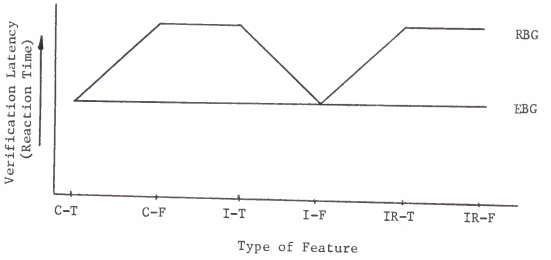
The RBG was expected to rely more often on a category-consistency/inconsistency-based relationship than the EBG as a result of weaker memory for past exemplars following categorization. The EBG was expected to rely more on memory scanning as a response strategy due to enhanced memory for past exemplars following categorization. Hence, by manipulating the consistency-inconsistency relationship of the to-be-verified features, EBG performance was expected to be more accurate than that of the RBG for consistent-unassociated and inconsistent-associated features (also referred to as consistent-false and inconsistent-true). For the remaining, consistent-true and inconsistent-false features, the category-based heuristic was believed to lead to comparable accuracies as the memory scanning procedure. The two groups were expected to perform equivalently on these. Further, for features that were perceived to be irrelevant for purposes of categorization, the category-based heuristic was believed to be inapplicable leading to greater accuracies for the EBG over the RBG. In addition to such

differential performance on verification accuracy, the two groups were also expected to differ on the latencies associated with such judgments. Superior memory for past exemplars was believed to lead the EBG to be faster in verifying features. Here, too, differences in speed were predicted for the consistent-false, inconsistent-true and irrelevant features, and equivalent latencies were predicted for the remaining features.

Differences in exemplar memorability between the two groups was also expected to reflect on their levels of confidence associated with the verification judgments. As per our previous discussion of the issue (Chapter Two), both groups were expected to express fairly high levels of confidence in the verification judgments. The RBG was expected to be more confident than the EBG when the target (to-be-verified) feature is viewed as extremely relevant (i.e., in terms of its relationship to the category defining rule). For category irrelevant features (i.e., where the category consistency/inconsistency based heuristic would be perceived to be inappropriate) the EBG by virtue of superior memory for past exemplars was predicted to express higher confidence than the RBG. Figure 4-2 shows the predicted pattern of results and the verification instruments that were used. (The list of verification questions that was used is included in Appendix B.)



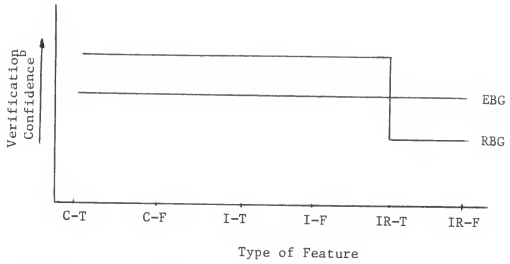
I) Verification Accuracy



II) Verification Latency

Figure 4-2

Predictions and Measures for Exemplar Memorability(H1); I)Verification Accuracy; II) Verification Latency; III) Verification Confidence.



III) Verification Confidence

---

a -- the following measures were used:

The store showing women's dresses had a painting on one of the walls.

(circle one) Yes No

b -- the following measure was used:

How confident are you of the decision you just made:

1 2 3 4 5 6 7 8 9

Not at all confident Very confident

Figure 4-2 -- Continued

H1A: the mediating role of overall similarity. After the verification judgments had been made, subjects (both groups) were asked to judge the pair-wise overall similarities between each of the two test instances and each of the three learning exemplars. In total, six such judgments were collected. Exemplar memorability differences between the groups (i.e., in verification accuracy, latency and confidence, Figure 4-2) were predicted only for those past exemplars that were viewed by the EBG as "somewhat similar" to either one or both the test instances. For past exemplars viewed either as extremely similar or dissimilar to both the test instances, group differences as in H1 were not predicted, i.e., both groups were predicted to perform equivalently on the three indices. This was so because only those exemplars perceived to be somewhat similar to the target would likely receive some degree of mental effort in the comparison process and hence demonstrate the above mentioned memorability differences between the two categorization mechanisms. Table 4-11 shows the overall similarity measure that was utilized.

H2: other processing indices (categorization based). Referring to our discussion of H2, the two groups were expected to differ with respect to the speeds and confidences associated with category judgments of the test instances. Specifically, the

Table 4-11

Overall Similarity Measure (H1A)

Example

How similar was the store showing women's dresses to the store showing cosmetics?

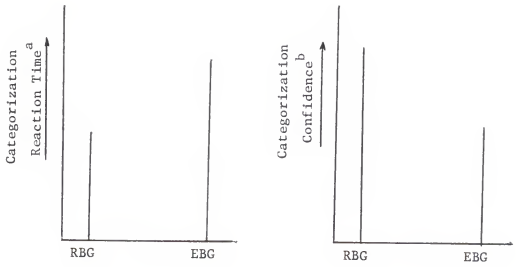
1 2 3 4 5 6 7 8 9

Not at all similar Very similar

RBG as a whole was expected to be faster and more confident in these judgments than the EBG. These expectations were predicated on certain characteristics of the judgment context and the nature of the category-defining rule. It was believed that such conditions were satisfactorily reflected in the study. First, no time limits were imposed during the category judgments. Also, in presenting subjects individually with the instructions (on a terminal), distractions in the environment were reduced to a minimum. The rule itself (conjunctive, involving two features) was believed to be simple, both to learn and to apply.[2] These conditions ensured that there was adequate opportunity and motivation (on the part of the RBG) for rule application. Also, our pretest 2, overall similarity data (Table 4-6), showed that none of the past exemplars appeared to be extremely similar/dissimilar to one or both test instances. Thus, it was felt that there would be an opportunity for the EBG to retrieve and rehearse the past exemplars during categorization leading potentially to speeds and confidences lower than that of the RBG. Figure 4-3 shows the predicted pattern of results described above, as well as the measure employed to obtain the same.

H3: other processing indices (verbalization). By H3, the RBG was expected to provide more accurate verbalizations of the

2. It was believed that further information regarding the perceived simplicity/complexity of the rule could be obtained by examining the RBG subjects' description of the same at the end of the learning phase.



---

a -- The following measure was used:

In your opinion, does the store showing COSMETICS/ANTIQUES fit into Mrs. Smith's preferred set of stores?

Yes No

b -- The following measure was used:

How confident are you about the judgement you just made?

1 2 3 4 5 6 7 8 9

Not at all confident Very confident

Figure 4-3

Predictions and Measures for Categorization Latency and Confidence (H2)

adopted categorization strategies than the EBG. Such differences in the quality of verbalizations were expected to be reflected in the range of strategies reported by the two groups following the categorizations. The RBG self-reports were expected to be strongly dominated by the specific rule learned by that group. The EBG was expected to report a number of strategies based on different information processing mechanisms. No strong predictions were offered regarding the specific nature of these (i.e., identification procedures were postponed till analysis of the data), but simply more nonanalytic, i.e., overall similarity comparisons were expected to be reported. No predictions were offered regarding the "absolute levels" of analytic and nonanalytic reports within the EBG. Several considerations (such as viewing analytic procedures to be "normatively appropriate" etc.) might lead the EBG subjects to report more analytic than nonanalytic strategies, even if the actual processing had been otherwise. Also, nonanalytic strategies might in themselves be more difficult to describe in words. Thus, it was predicted that a) the RBG would display a narrower range of reported strategies dominated by rule-analytic descriptions; b) the EBG would display a broader range of process self-reports with significant descriptions of nonanalytic strategies in addition to analytic ones.

Table 4-12 shows the format of the questionnaire that was used.

Table 4-12

Self-Report Questionnaire for Categorization Strategies (H3)

These are just a few more questions that will help us understand the product judgments you made in the study.

Please indicate how or on what basis you decided that the store showing COSMETICS would or would not fit into Mrs. Smith's preferred set of stores (tell us what your thoughts were in making the judgement).

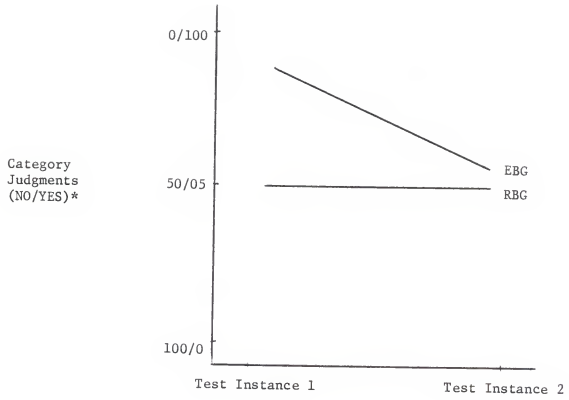
Please indicate how or on what basis you decided that the store showing ANTIQUES would or would not fit into Mrs. Smith's preferred set of stores (tell us what your thoughts were in making the judgement).

H4: contingent factor (category knowledge). As described under discussions on H1, the EBG was predicted to adopt an exemplar-based nonanalytic strategy, while the RBG was expected to adopt an analytic strategy based on the learned rule. To assess the validity of such a proposition, the entire pattern of results across the several indices needs to be considered. While the verification-based indices were considered to be central in terms of determining processing mechanisms, the others were believed to be of significant diagnostic value. Several configurations of such results might be envisaged. For example, if both verification (H1) and categorization-based (H2) predictions were realized, then there would be firm support for H4. If H1 is not realized, but H2 is, then the validity of this hypothesis becomes dubious. This is so because it might be argued that the EBG in the course of the study had abstracted a rule for categorizing and used the same. Since the RBG had the advantage of knowing that a rule was "true" (i.e., confirmed in the experiment) rather than inducing such,it might display greater confidence and lower latency than the EBG in categorization. This, then, would disconfirm H4, particularly if verification predictions were unrealized. Similarly, self-reports might point at possible confirmations/disconfirmations if specific verbalizations were found to be dominating.

H5: contingent factor (form of exemplars, picture/word). In study 1, all category exemplars (i.e., stores preferred by Mrs. Smith), as well as the two test instances were presented through pictures. Therefore, according to the hypothesis, exemplar-based nonanalytic processing was expected. Such predictions were made only for the EBG. The reason for the above is as follows: the picture-word distinction was believed to influence categorization mechanisms as hypothesized, only, when the judgment context was free from cues that dictated or encouraged specific processing routes. Since the RBG was instructed as to the category-defining rule (including asking them to write it down in their own words), it is reasonable to expect that they would use the latter during the categorizations. This specific task orientation would likely lead to analytic processing even if pictorial images of past exemplars were evoked. In other words, nature of the procedures adopted for the RBG was predicted to annul the "normal" processing orientation following from pictorial presentation of learning exemplars and test instances. For the EBG, no such perceived task demands were expected. Thus, in congruence with H5, the latter were predicted to adopt exemplar-based nonanalytic processing. Such was believed to lead to group differences in the key verification-based and other processing measures described earlier.

In our investigation, H5 was examined by comparing between studies 1 (pictorial presentation) and 2 (words-only presentation). Insights, rather than conclusions, are appropriate here because nonequivalence between the stimuli (besides the picture-word distinction) utilized in the two studies are likely. Such an equivalence was not attempted for the following reasons a) achieving equivalences between a picture-only and words-only presentation of the same exemplar (i.e., in information content etc.) was viewed as problematic; and b) creating additional experimental conditions (i.e., EBG and RBG that would view words only exemplars) was viewed as problematic from a logistic standpoint.

Category judgment predictions. Even though no hypothesis was advanced regarding the category judgments for the two instances, experimental conditions were created (i.e., stimulus configurations) to assess the validity of the category-judgment paradigm in capturing processing differences. Pretests 1-4 were conducted to ensure that differences in category judgments would emerge between the EBG and the RBG if the two distinct mechanisms were indeed adopted. Figure 4-4 shows the nature of judgments that were predicted. Test instance 1 (the store showing cosmetics) was established through pretest 3 to be neither very similar nor very dissimilar to the acceptance category using the



---

* NO/YES -- proportion of nonacceptance/acceptance judgments in terms of the learning set.

EBG -- exemplar-based group
RBG -- rule-based group

Figure 4-4

Study 1: Predicted Pattern of Results for Category Judgments

category defining rule. It was, however, perceived to be quite similar in an overall sense to each of the three learning exemplars. Thus, if the RBG subjects adopt the given rule in categorizing, then they should perceive this test instance as being somewhat ambiguous in terms of its membership in the acceptance category (i.e., overall group judgments should be about 50% in favor and 50% against inclusion). If the EBG subjects indeed adopt an overall-similarity-based process similar to that in pretest 3, then they should, generally speaking, perceive this test instance to be similar to past exemplars and hence suitable for inclusion in the acceptance category. Test instance 2 (store showing antiques) was perceived as not being either very similar or very dissimilar to the acceptance category on the basis of both rule and overall similarity. Thus, both groups were predicted to categorize it as being somewhat ambiguous with respect to the acceptance category.

Even though significant care was taken to ensure that the selected stimuli satisfied the rule and overall-similarity properties necessary for a fair evaluation of the category-judgment paradigm, some discrepancies were observed through pretest 4 (Figure 4-1). For example, it was observed that rule-based properties, other than that intended, might also characterize the learning exemplars and test instances. If these are selectively invoked during categorization, then the predicted

judgment patterns might not materialize. While the above does not reflect an inherent problem in working with outcome measures per se, at the very least they point at difficulties in applying the same for real products/brands, where such necessary constraints might not naturally exist.

Additional data

At the end of the Response phase, all subjects were asked to provide information on the following: his/her preferred style of information processing; his/her level of prior familiarity with department stores; the sex of the respondent. Our interest in attempting to determine the dominant processing style of each subject stemmed from our discussion of the "mixed model". Briefly, it was believed that, given relatively "neutral" judgment contexts, an individual's preferred style of processing (i.e., analytic or nonanalytic) could influence the adoption of specific categorization mechanisms. An exploration of the above relationship involved using an instrument that would be capable of measuring the said processing styles. As discussed earlier, the role of processing styles has not received prior attention in the context of categorization processes in past research. Hence, no such processing style measuring scale was available. Thus, a twelve item rating scale instrument was designed, including items

that intuitively seemed to be capable of reflecting two distinctly different processing styles, i.e., analytic and nonanalytic. Given the primary focus of the study, detailed analysis of the psychometric properties of the above instrument was not addressed. Rather, the interest was to ascertain if subjects' categorization processes (as reflected in the various dependent measures) showed signs of differences based on their self-reported processing styles. The above, then, could be treated as a pilot study, before undertaking more rigorous individual difference investigations. A copy of the questionnaire that was used is included in Appendix C.

In addition to our intuitive assessment of subjects' prior knowledge with respect to department stores, a formal rating of prior familiarity was also sought (Appendix D). Subjects were also asked to indicate their sex, for purposes of gaining insight into any systematic processing differences between men and women.

Study 2: Vacation Tours

Subjects participating in the experiment were believed to possess generally low levels of prior knowledge regarding this class of services possibly due to the relatively high expense associated with such tours. Accordingly, subjects were expected to rely more heavily on the category knowledge acquired during

the study (i.e., exemplars and/or rules) and less on prior information compared to the class of department stores.

The distinctive aspect of study 2 was that here past exemplars, as well as test instances, were presented exclusively through words (i.e., descriptions of the trips).

Category knowledge manipulation

The category knowledge manipulation consisted of providing respondents in the RBG with a feature-based rule for the acceptance category. Specifically, respondents in this group were informed (after exposure to the series of learning-phase exemplars) that the individual associated with this category, (Mr. Jones) preferred tours that contained more personal-enrichment-oriented features (e.g., visits to museums, historical sites, etc.) than those oriented towards relaxation (e.g., beach parties, casino visits, etc.). The choice of the specific rule was guided by the general perception in the travel industry regarding the several categories of preference for such tours. While specific attribute structures often underly the above distinction, it was believed that the two sub-categories (i.e., personal-enrichment and relaxation oriented tours) conveyed distinctive impressions that could be relied on fairly intuitively.

Stimuli

Overall criteria for the selection of stimuli were identical to that in study 1. Tables 4-13 and 4-14 show the configurations that were deemed necessary (i.e., all the three learning-phase exemplars be perceived as being consistent with the learned rule, as well as somewhat similar to each other). Table 4-14 shows the desired configuration of the test instances. Here, too, the location of TI1 and TI2 in the similarity matrix was arbitrary and guided by similar considerations and constraints as in Study 1. The specific properties of TI1 and TI2 were, however, different. Specifically, TI1 and TI2 were both positioned as somewhat similar as well as somewhat dissimilar to the learning exemplars. Thus, exemplar-based nonanalytic processing could be expected to lead to categorization of both as being somewhat ambiguous in terms of the acceptance category (i.e., tours preferred by Mr. Jones). TI1 was positioned as being somewhat consistent, as well as somewhat inconsistent with the category rule. TI2 was positioned as being clearly inconsistent with the rule. Thus, it was expected that rule-based analytic processing would lead to classification of TI1 as ambiguous (similar to exemplar-nonanalytic processing) and TI2 as <u>not</u> fit for inclusion in the acceptance category. This last judgment was expected to be different from that arising from exemplar-nonanalytic processing providing a means for distinguishing between the two processes.

Table 4-13

Study 2: Desired Stimulus Configuration for Learning Exemplars

Exemplar	Similarity Properties	
	Rule Properties	Overall Similarity Properties
LE1	Consistent with the category rule	Intermediate level of overall similarity with the other two (i.e., LE2, LE3)
LE2	Consistent with the category rule	Intermediate level of overall similarity with the other two (i.e., LE1, LE3)
LE3	Consistent with the category rule	Intermediate level of overall similarity with the other two (i.e., LE1, LE2)

LE1 -- learning phase exemplar 1 (identification: Wildlife in India)
LE2 -- learning phase exemplar 2 (identification: Egypt and the Middle East)
LE3 -- learning phase exemplar 3 (identification: Alps-Central Europe)

Table 4-14

Study 2: Desired Stimulus Configuration for Test Instances

Overall Similarity	Rule-Based Similarity: High	Rule-Based Similarity: Medium	Rule-Based Similarity: Low
High			
Medium		TI1	TI2
Low			

TI1-- test (to-be-categorized) instance 1 (identification: Iberian Sunseeker)
TI2 -- test (to-be-categorized) instance 2 (identification: Mexico)

Tables 4-15 through 4-20 and Figure 4-5 display the results of Pretests 1-5, which were identical in every respect to those conducted for Study 1, albeit involving different stimuli. (Similar formats of presentation have also been adopted for these.) Summarizing Pretests 1-3, it was found that all learning exemplars were viewed as consistent with the given rule and somewhat similar to each other in an overall sense (i.e., condition in Table 4-13). Also, test instances were found to satisfy the desired rule and overall-similarity conditions (p value of the mean difference between TI1 and TI2, Table 4-14, was 0.04). Figure 4-5 shows the alternative rules that might characterize the stimuli and the outcome patterns associated with the same. As in Study 1 pretest subjects were asked to recall all features of learning and categorization-phase exemplars that most readily came to mind. It was found that subjects could form alternative rules based on either the most characteristic type of cuisine, or the most typical climate associated with the tour descriptions. These, in turn, could lead to category-judgment patterns c or d (Figure 4-5). The above knowledge was viewed as potentially important in interpreting the categorizations observed in the study. Since distinct patterns of judgment could be predicted for both the exemplar-nonanalytic (i.e., pattern b) and rule-analytic (pattern a) models, the present set of stimuli was deemed appropriate for purposes of testing the category-judgment paradigm. Table 4-20 shows that verification aspects

Table 4-15

Pretest 1: Rule-Based Similarity of Learning Exemplars

Experimental Phase	Exemplar	Mean Rating[a]	Variance	Remarks
Learning	Wildlife of India	6.65	2.1	Consistent with the rule, as desired
	Egypt & Middle East	7.15	2.2	Consistent with the rule, as desired
	Alps-Central Europe	6.01	2.3	Consistent with the rule, as desired

a-- the following scale embodying the category defining rule was used:

1 2 3 4 5 6 7 8 9

Entirely relaxation oriented — Half relaxation, half personal enrichment oriented — Entirely personal enrichment oriented

Table 4-16

Study 2, Pretest 2: Overall Similarity of Learning Exemplars

	Wildlife of in India			Egypt & the Middle East			Alps-Central Europe			Remarks
	HS	SS	NS	HS	SS	NS	HS	SS	NS	
Wildlife of India				15	40	45	25	35	40[a]	Somewhat similar to the other two, as desired
Egypt and the Middle East	15	40	45				25	40	35	Somewhat similar to the other two, as desired
Alps-Central	22	35	40	25	40	35				Somewhat similar to the other two, as desired

HS -- highly similar in an overall sense
SS -- somewhat similar in an overall sense
NS -- not at all similar in an overall sense

a -- percentage of total responses in this category

Table 4-17

Study 2, Pretest 3: Rule Similarity Properties of Test Instances

Experimental Phase	Exemplar	Mean Rating[a]	Variance	Remarks
Categorization	Iberian Sunseeker (TI1)	5.05	1.75	Neither similar nor dissimilar to the acceptance category, as desired
	Mexico (TI2)	3.95	2.0	Not similar to the acceptance category, as desired

a -- the following scale embodying the category defining rule was used:

1 2 3 4 5 6 7 8 9

Entirely relaxation oriented — Half relaxation, half personal enrichment oriented — Entirely personal enrichment oriented

TI1 -- test instance 1
TI2 -- test instance 2

Table 4-18

Study 2, Pretest 3: Overall Similarity Properties of Test Instances

	Wildlife in India			Egypt & the Middle East			Alps-Central Europe			Remarks
	HS	SS	NS	NS	SS	NS	HS	SS	NS	
IberianSunseeker (TI1)	10	50	40	5	60	35	10	45	45*	Neither highly similar nor highly dissimilarto learning set, as desired
Mexico (TI2)	15	40	45	20	25	55	5	60	35	Neither highly similar nor highly dissimilar to learning set,as desired

HS -- highly similar in an overall sense
SS -- somewhat similar in an overall sense
NS -- not at all similar in an overall sense

* percentage of responses in this category

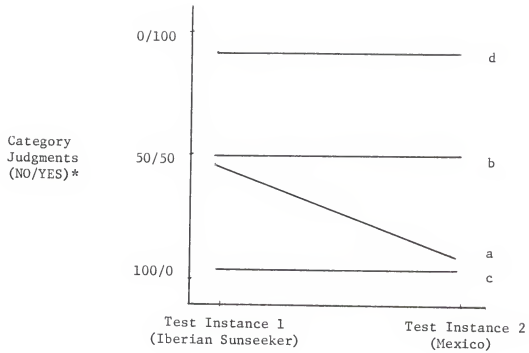
Table 4-19

Study 2, Pretest 4: Alternative Rules

	Features	
Learning Exemplars	F1	F2
Wildlife of India	1	1
Egypt and the Middle East	2	1
Alps-Central Europe	2	2
Test Instances		
Iberian Sunseeker	1	1
Mexico	1	1

F1 -- cuisine 1 = local cuisine
2 = western cuisine

F2 -- climate 1 = tropical
2 = mild



---

* NO/YES -- proportion of nonacceptance/acceptance judgments in terms of learning set (i.e., whether or not the test instance would be preferred by Mr. Jones).

a -- analytical, based on category defining rule communicated to RBG subjects

b -- exemplar overall-similarity based nonanalytic process

c -- analytic process based on characteristic value on F1 (2)

d -- analytic process based on characteristic value on F2 (1)

Figure 4-5

Study 2: Category Judgment Predictions Based on Alternative Models

Table 4-20

Study 2, Pretest 5: Relative Salience of Verification Aspects

Learning Exemplars	Question Type					
	Consistent		Inconsistent		Irrelevant	
	True	False	True	False	True	False
Wildlife of India	55%	68%	62%	55%	55%	69%[a]
Egypt and the Middle East	72%	55%	56%	80%	77%	80%
Alps-Central Europe	74%	64%	72%	55%	55%	75%

a -- percentage of accurate verification of this feature.

chosen for the study were within the stipulated range (55-80% verification accuracy), i.e., the range of salience that was considered appropriate for demonstrating exemplar memorability effects.

In addition to the above, since stimuli for Study 2 (i.e., learning exemplars and test instances) were presented through words, they were pretested to determine whether or not they were equivalent in terms of certain dimensions of processing ability and motivation. Motivation to process the to-be-categorized instance, for example, was believed to be important as respondents would need to sustain enough interest in reading the tour descriptions (about three-fourths of a page each) to be able to identify the rule-relevant aspects. In addition, clarity of the description would be important in determining the relative difficulty of feature identification. For exemplar-based processing it was believed that the relative imagibility of each trip in terms of the written descriptions that were provided would be an important factor in determining the ease with which such overall similarity comparisons might be made. Thus, it was believed that the tour descriptions should be such that they were more or less equivalent in terms of these dimensions. While the latter might themselves constitute important stimulus-based factors influencing categorization mechanisms, they were maintained at levels favorable to both analytic as well as

nonanalytic mechanisms. This, then, would allow us to attribute processing differences (if any) to the contingencies directly investigated in this study. Results of Pretest 6 (table 4-21) show that all the tour descriptions were more or less equivalent in terms of the three dimensions (i.e., clarity, visualizability, and level of interest) and hence appropriate for the study.

Dependent measures and operational predictions

The dependent measures for all the hypotheses were identical to those utilized in study 1, albeit involving different stimuli. The pattern of predicted results for those were also similar between the two studies. The only critical exception involved Hypothesis H5 (i.e., the picture-word distinction). As may be recalled, in contrast to presenting learning exemplars and test instances pictorially (as in Study 1), here words were used to described these. To the extent this particular form of presentation encourages an analytic orientation, subjects in both conditions were expected to demonstrate greater reliance on analytic categorization mechanisms than that evidenced in Study 1. The RBG was, of course, expected to utilize the learned rule possibly due to perceived task demands. Thus, no significant difference between the EBG and the RBG was expected here. Rather, it was believed

Table 4-21

Study 2, Pretest 6: Relative Clarity, Imagibility and Interest Value of Learning Exemplars and Test Instances

Experimental Phase	Items	Mean[a] Clarity	Mean[b] Imagibility	Mean Interest[c] Value
Learning	India	5.8	5.1	4.5
	Egypt	6.0	5.0	4.9
	Alps	6.1	5.6	5.2
Categorization	Iberia	5.8	5.3	5.1
	Mexico	5.5	5.4	5.0

a. scale: How clear an idea of the various aspects of the trip is formed in your mind on reading the description?

1 2 3 4 5 6 7

Very Unclear — Very Clear

b. scale: How clearly can you visualize the trip in terms of its overall picture from reading the written description?

1 2 3 4 5 6 7

Not at all Visualizable — Highly Visualizable

c. scale: How interesting do you find the trip from reading the description?

1 2 3 4 5 6 7

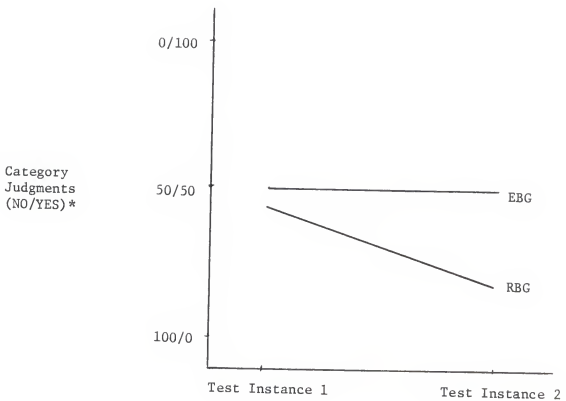
Very Uninteresting — Very Interesting

that the word-only presentation would influence the EBG into adopting a somewhat more analytic orientation than that in the previous study. Depending upon the strength of this particular contingency, the above could lead to a) attenuation of group differences on the measures associated with H1-H3, or b) even complete elimination of group differences due to adoption of a common (i.e., analytic) processing strategy.

Finally, consistent with the configurations of the learning and test stimuli (Tables 4-13, 4-14), differences in category judgment outcomes between the two groups were predicted as in Figure 4-6.

Study 3: Alcoholic Beverages

Subjects were believed to have a fair level of prior experience in this product category (taken as a whole), probably more extensive than that with vacation tours (i.e., greater interaction with specific exemplars, as well as some knowledge of important attributes), but this would probably be less extensive than that for department stores. Thus, the overall product category utilized in Study 3 was believed to reflect intermediate levels of prior conceptual knowledge on the part of the participating subjects. This in turn might lead to some reliance on exemplars and/or rules (for the category) learned external to



---

* NO/YES -- Proportion of nonacceptance/acceptance judgments in terms of the learning set.

* EBG -- exemplar-based group

* RBG -- rule-based group

Figure 4-6

Study 2: Predicted Pattern of Results for Category Judgments

the study, potentially creating some "noise" in the observed patterns of results.

Category knowledge manipulation

The category-knowledge manipulation consisted of providing the RBG with the following rule for the acceptance category (i.e., alcoholic beverages prefered by Mrs. Baker): the alcoholic beverages that are preferred by Mrs. Baker are all appropriate for consumption after dinner. Similar to that in studies 1 and 2, the selection of the above rule was guided by the general perception regarding different types of alcoholic beverages, i.e., after-dinner, during-dinner, or before-dinner drinks.

The design of Study 3 is somewhat different in that investigating Hypothesis H1 (i.e., exemplar memorability) involved only two types of verification features instead of six employed in Studies 1 and 2. All other hypotheses were investigated in a fashion identical with the previous studies. The two types of verification aspects used were irrelevant-true and irrelevant-false features associated with each of the three exemplars acquired during the learning phase. The consistent and inconsistent aspects (both true and false) were not included for the following reason: careful consideration of the acceptance

category (i.e., alcoholic beverages preferred by Mrs. Baker) and its defining rule (i.e., those that were appropriate for consumption after dinner) suggested that few features were available that could be viewed as being fairly consistent or inconsistent with the category. The notion of consistency or inconsistency may be viewed similarly to the cue-validities associated with different features. Features that are highly predictive of a certain category membership, i.e., features with high cue-validities might also be viewed as being consistent with the category. Conversely, inconsistent features might be viewed as those that possess high cue-validities for contrasting categories. Considering the nature of the acceptance category in this study (after-dinner drinks) with potentially contrasting ones (e.g., before-dinner, or during-dinner drinks), practically no feature was available that possessed high cue-validities vis-a-vis any of the above. That is, neither the nature of presentation of the product (i.e., color, packaging, etc.), nor consumption accessories provided opportunities for identifying specific features that could be perceived, generally speaking, as being consistent/inconsistent with the acceptance category. Thus, features that could in no way be related to any basis for distinguishing within alcoholic beverages, i.e., irrelevant features, were used for assessing exemplar memorability effects.

Stimuli

Overall criteria for the selection of stimuli were identical to that of studies 1 and 2. Tables 4-22 and 4-23 show the configurations that were utilized. Tables 4-24 and 4-25 display the results of pretests 1 and 2 (similar procedures, albeit with different exemplars were utilized as before) which confirm the rule and overall-similarity properties that were desired for the learning exemplars. Table 4-26 (Pretest 3) shows that required configurations for the test instances were also achieved. Specifically, TI1 was perceived as being both rule consistent and similar (in an overall sense) to the learning exemplars. TI2 was viewed as rule-inconsistent but similar to the learning set. Pretest 4 (Table 4-28 and Figure 4-7) showed that three alternative models (all analytic) could be invoked to characterize the learning exemplars and test instances. Such models introduced a degree of ambiguity in terms of making unique predictions for category-judgment outcomes following from the two specific mechanisms under investigation. This knowledge was viewed as being potentially important in interpreting the category assignment results from the main experiment. Table 4-29 (Pretest 5) shows that the relative salience of each verification aspect was within the stipulated range.

Table 4-22

Study 3: Stimulus Configuration for Learning Exemplars

Exemplar	Similarity Properties	
	Rule Properties	Overall Similarity Properties
LE1	Consistent with the category rule	Intermediate level of overall similarity with the other two (i.e., LE2, LE3)
LE2	Consistent with the category rule	Intermediate level of overall similarity with the other two (i.e., LE1, LE3)
LE3	Consistent with the category rule	Intermediate level of overall similarity with the other two (i.e., LE1, LE2)

LE1 -- learning phase exemplar 1 (identification: Baileys)
LE2 -- learning phase exemplar 2 (identification: Cointreau)
LE3 -- learning phase exemplar 3 (identification: Hiram Walker)

Table 4-23

Study 1: Stimulus Configuration for Test Instances

		Rule-Based Similarity		
		High	Medium	Low
Overall Similarity	High	TI1		TI2
	Medium			
	Low			

TI1 -- test (to-be-categorized) instance 1 (identification: B&B)

TI2 -- test (to-be-categorized) instance 2 (identification: Tanqueray)

Table 4-24

Study 3, Pretest 1: Rule-Based Similarity of Learning Exemplars

Experimental Phase	Exemplar	An After-Dinner Drink[a]	A During-Dinner Drink	A Before-Dinner Drink	Remarks
Learning	Baileys	78	5	17[b]	Consistent with rule, as desired
	Cointreau	59	30	11	Consistent with rule, as desired
	Hiram Walker Brandy	73	7	20	Consistent with rule, as desired

a -- the following response categories embodying the category defining rule were used:

The _____ brand is an:

after-dinner drink	during-dinner drink	before-dinner drink

b -- percentage of responses in this category

Table 4-25

Study 3, Pretest 2: Overall Similarity of Learning Exemplars

	Baileys			Cointreau			Hiram-Walker			Remarks
	HS	SS	NS	NS	SS	NS	HS	SS	NS	
Baileys				25	45	30	30	48	22[a]	somewhat similar to the other two, as desired
Cointreau	25	45	30				34	38	28	Somewhat similar to the other two as desired
Hiram Walker Brandy	30	48	22	34	38	28				Somewhat similar to the other two, as desired

HS -- highly similar in an overall sense
SS -- somewhat similar in an overall sense
NS -- not at all similar in an overall sense

a - percentage of responses in this category

Table 4-26

Study 3, Pretest 3: Rule Similarity Properties of Test Instances

Experimental Phase	Exemplar	Percentage Response			Remarks
		After Dinner	During Dinner	Before Dinner	
Categorization	B&B (TI1)	62	15	23	Similar to acceptance category, as desired
	Tanqueray (TI2)	23	15	62	Dissimilar to acceptance category, as desired

TI1 -- test instance 1
TI2 -- test instance 2

Table 4-27

Study 3, Pretest 3: Overall Similarity of Test Instances

Test Instance	Baileys			Cointreau			Hiram-Walker			Remarks
	HS	SS	NS	NS	SS	NS	HS	SS	NS	
B&B	19[a]	53	28	25	30	45	32	38	30	Similar to learning set, as desired
Tanqueray	24	28	48	47	29	24	14	51	35	similar to learning set as desired

HS -- highly similar in an overall sense
SS -- somewhat similar in an overall sense
NS -- not at all similar in an overall sense

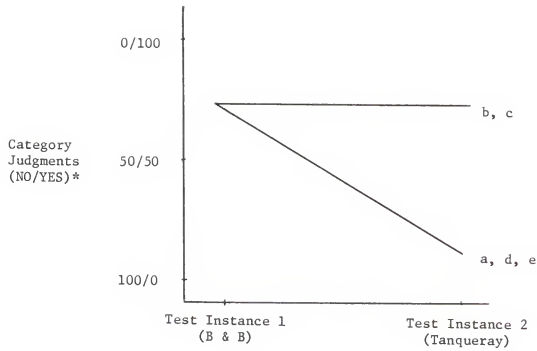
a -- percentage of responses in this category

Table 4-28

Study 3, Pretest 4: Alternative Rules

	Features			
Learning Exemplars	F1	F2	F3	F4
Baileys	1	3	2	1
Cointreau	2	1	2	1
Hiram Walker Brandy	5	4	1	0
Test Instances				
B&B	2	2	2	1
Tanqueray Gin	4	1	3	1

F1 -- origin 1 = Irish; 2 = French; 3 = Italian; 4 = English; 5 = American
F2 -- colour 1 = light; 2 = dark; 3 = creamy; 4 = different coloured
F3 -- type 1 = brandy; 2 = liqueur; 3 = gin
F4 -- expensive 1 = yes; 2 = no



---

* proportion of nonacceptance/acceptance judgments in terms of learning set (i.e., whether or not the test instance would be preferred by Mrs. Baker)

Alternative Categorization Models

a -- analytical, based on categorization rule communicated to RBG subjects

b -- exemplar overall-similarity based nonanalytic process

c -- analytic process based on characteristic value on F4 (1)

d -- analytic process based on characteristic value on F3 (2)

e -- analytic similarity to specific exemplar (B&B to Cointreau)

Figure 4-7

Study 3: Category Judgment Predictions Based on Alternative Models

Table 4-29

Study 3, Pretest 5: Relative Salience of Verification Aspects

Learning Exemplar	Question Type	
	Irrelevant-True	Irrelevant False
Baileys	69%[a]	55%
Cointreau	71%	63%
Hiram Walker Brandy	55%	55%

a -- percentage of accurate verification of this feature

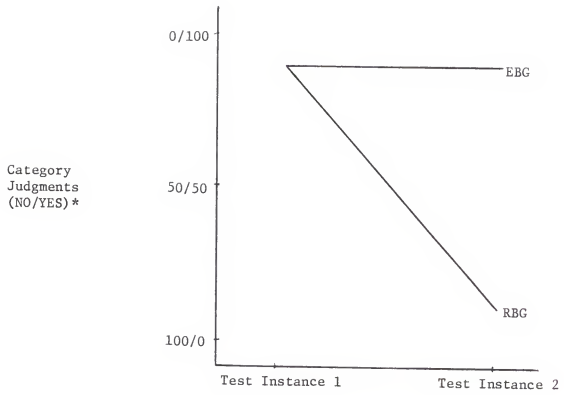
Dependent measures and operational predictions

All dependent measures utilized in Study 3 were similar in format to those in studies 1 and 2. As described earlier, the exemplar memorability measures (i.e., verification accuracy, latency and confidence) involved only category irrelevant features. As per our previous discussion (see Study 1), the EBG was expected to be more accurate, faster and more confident in verifying these than the RBG. No differential predictions were made between true and false features. Predictions for H2, H3 and H4 were similar to that in the previous studies. With regard to H5 (i.e., picture-word distinction), results were predicted to parallel those of study 1 since both learning exemplars as well as test instances were presented exclusively through pictures.

Figure 4-8 displays the category-judgment predictions that were made. Referring back to Table 4-23, it was predicted that TI1 would be judged as fitting the acceptance category by both groups of subjects. It was also predicted that the RBG would judge TI2 as not being a member of the acceptance category, while the EBG would judge in favor of inclusion.

Study 4: Residential Homes

It was believed that our subjects were moderately knowledgeable regarding the overall category of residential homes



---

* NO/YES -- proportion of non-acceptance/acceptance judgments in terms of the learning set

EBG -- exemplar-based group
RBG -- rule-based group

Figure 4-8

Study 3: Predicted Pattern of Results for Category Judgments

(i.e., possessed some featural rules and limited numbers of exemplars).

Category knowledge manipulation

Subjects in the RBG condition were told that the houses preferred by Mr. Dickson (i.e., the relevant acceptance category) possessed both the following features a) they were either one or two-storied, b) they were characterized by simple rather than cluttered design (i.e., in walls, windows, etc.). The above constituted the defining rule for the acceptance category. The above rule was arrived at through informal discussions with experts on architectural design. It was believed that even though several categories of styles were common, each of which could be defined on a number of distinctive attributes (i.e., design of columns, patios, etc.), individuals tend to view these as falling into some general intuitive categories. One of these styles is what is commonly referred to as the "Northeastern" home. Individuals seem to possess a fairly strong intuitive picture of such a category (possibly with some specific examples) and in addition are able to distinguish those homes that do/do not fit such a category fairly spontaneously. In addition, features as in the above (i.e., a and b) are also commonly associated with these houses. The rich feature-based distinction

between styles of homes, as well as their availability in memory as concerete instance (e.g., the house I lived in, other homes I have been to, etc.), was believed to provide an opportunity for investigating the alternative categorization mechanisms.

Stimuli

Tables 4-30 and 4-31 show the configurations that were set up for this study. Tables 4-32 to 4-35 (Pretests 1-3) show that the chosen stimuli (i.e., learning exemplars and test instances) matched these requirements. (The p value ofthe mean difference between TI1 and TI2, i.e., pretest 3, Table 4-34, was = .04.) Table 4-36 and Figure 4-9 show the nature of alternative models and their outcomes. Five different models (all analytic) were found that could be adopted. The outcome pattern associated with an exemplar-based nonanalytic process, however, was found to be distinct from each one of these. Thus, the related set was deemed appropriate for purposes of the study. Table 4-37 shows that the verification features were within the stipulated range of accuracy.

Dependent measures and operational predictions

The measures and predictions utilized in Study 4 were similar to those of Study 3. Here, too, lack of availability of

Table 4-30

Study 4: Desired Stimulus Configuration for Learning Exemplars

Exemplar	Similarity Properties	
	Rule Properties	Overall Similarity Properties
LE1	Consistent with the category rule	Intermediate level of overall similarity with the other two (i.e., LE2, LE3)
LE2	Consistent with the category rule	Intermediate level of overall similarity with the other two (i.e., LE1, LE3)
LE3	Consistent with the category rule	Intermediate level of overall similarity with the other two (i.e., LE1, LE2)

LE1 -- learning phase exemplar 1 (identification: red house)
LE2 -- learning phase exemplar 2 (identification: red & white house)
LE3 -- learning phase exemplar 3 (identification: pink & white house)

Table 4-31

Study 4: Desired Stimulus Configuration for Test Instances

		Rule-Based Similarity		
		High	Medium	Low
Overall Similarity	High			TI1
	Medium			
	Low	TI2		

TI1 -- test (to-be-categorized) instance 1 (identification: beige house)
TI2 -- test (to-be-categorized) instance 2 (identification: brown house)

Table 4-32

Study 4, Pretest 1: Rule Similarity of Learning Exemplars

Experimental Phase	Exemplar	Mean Rating[a]	Variance	Remarks
Learning	Red	3.89	1.71	Consistent with the rule as desired
	Blue and White	2.84	1.01	Consistent with the rule as desired
	Pink and White	4.61	2.23	Consistent with the rule as desired

a -- the following scale embodying the category defining rule was used:

1 2 3 4 5 6 7 8 9

Very similar to an old Northeastern House

Very dissimilar to an old Northeastern House

Table 4-33

Study 4, Pretest 2: Overall Similarity of Learning Exemplars

	Red House			Blue and White House			Pink and White House			Remarks
	HS	SS	NS	NS	SS	NS	HS	SS	NS	
Red House				15[a]	38	47	10	40	50	Somewhat similar to the other two, as desired
Blue and White House	15	38	47				17	44	39	Somewhat similar to the other two, as desired
Pink and White House	10	40	50	17	44	39				Somewhat similar to the other two, as desired

HS -- highly similar in an overall sense
SS -- somewhat similar in an overall sense
NS -- not at all similar in an overall sense

a -- percentage of responses in this category

Table 4-34

Study 4, Pretest 3: Rule Similarity Properties of Test Instances

Experimental Phase	Exemplar	Mean Rating[a]	Variance	Remarks
Categorization	Beige House (TI1)	6.61	1.95	Dissimilar to the acceptance category as desired
	Brown House (TI2)	4.20	1.75	Similar to the acceptance category as desired

TI1 -- test instance 1
TI2 -- test instance 2

Table 4-35

Study 4, Pretest 3: Overall Similarity Properties of Test Instances

	Red House			Blue and White House			Pink and White House			Remarks
	HS	SS	NS	NS	SS	NS	HS	SS	NS	
Beige House	10	61	29	15	37	48	11	46	43[a]	Similar to acceptance category, as desired
Brown House	11	39	50	9	38	53	11	29	61	Dissimilar to acceptance category, as desired

HS -- highly similar in an overall sense
SS -- somewhat similar in an overall sense
NS -- not at all similar in an overall sense

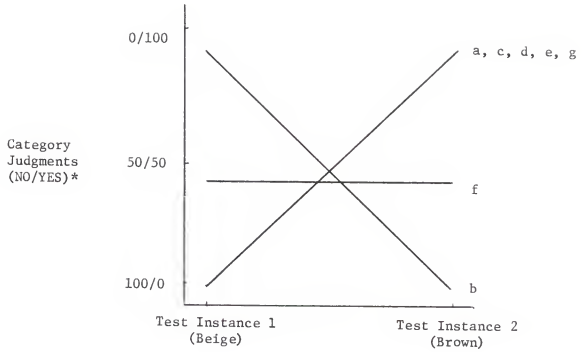
a -- percentage of responses in this category

Table 4-36

Study 4, Pretest 4: Alternative Rules

	Features			
Learning Exemplars	F1	F2	F3	F4
Red	2/3	2	0	1
Blue and White	1/2	2	0	1
Pink and White	2/3	2	2	0
Test Instances				
Beige	1/2	0	2	0
Brown	2/3	2	2	1

F1 -- trees 1 = a lot; 2 = somewhat; 3 = few
F2 -- expensive 1 = yes; 2 = somewhat; 3 = no
F3 -- modern 1 = yes; 2 somewhat; 3 = no
F4 -- two-storied 1 = yes; 2 = no



---

* proportion of nonacceptance/acceptance judgments in terms of learning set (i.e., whether or not the test instance would be preferred by Mr. Dickson)

a -- analytical, based on category rule communicated to RBG subjects

b -- exemplar overall-similarity based nonanalytic process

c -- analytic process based on characteristic value on F1 (2/3)

d -- analytic process based on critical value on F2 (2)

e -- analytic process based on characteristic value on F4 (1)

f -- analytic process based on characteristic value on F3 (0)

g -- analytic similarity to specific exemplars (brown to pink and white)

Figure 4-9

Category Judgment Predictions Based on Alternative Models

Table 4-37

Study 4, Pretest 5: Relative Salience of Verification Aspects

	Question Type	
Learning Exemplar	Irrelevant-True	Irrelevant False
Red House	70%[a]	67%
Blue and White House	65%	65%
Pink and White House	65%	80%

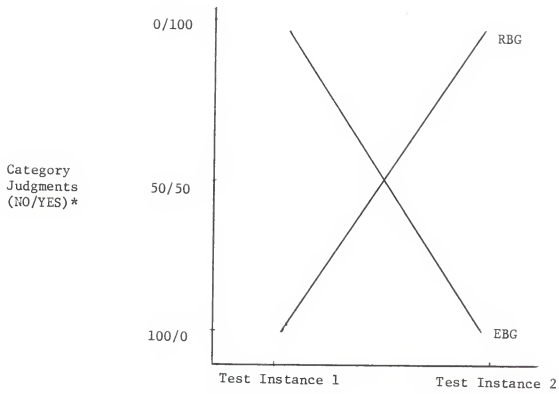
a -- percentage of accurate verification of this feature

consistent and inconsistent features led to use of irrelevant features only for testing H1. Further, all learning exemplars and test instances were presented exclusively through pictures. Thus, predictions (on H4) similar to those for studies 1 and 3, were expected here.

Finally, consistent with the rule and overall-similarity properties of the test instances (Tables 4-34 and 4-35), category- judgment predictions, as in Figure 4-10, were made. Specifically, it was predicted that TI1 would be judged as fitting the acceptance category by the EBG. The RBG, however, should view it as being inconsistent with the learned rule and exclude it from the acceptance category. TI2 would be rejected by the EBG (due to low overall similarity to the learning exemplars), but judged fit for inclusion by the RBG due to its consistency with the rule.

Experimental Design

Recalling our discussion of the procedures, all four studies described above were included in a common experimental task. Thus, dependent measures used in the study pertained to each of the hypotheses, as well as to each of the product classes. There were two between-subjects variables: group (i.e., EBG or RBG, corresponding to our knowledge manipulation in



---

* NO/YES -- proportion of nonacceptance/acceptance judgments in terms of the learning set

EBG -- exemplar-based group
RBG -- rule-based group

Figure 4-10

Study 4: Predicted Pattern of Results for Category Judgments

each study) and the sequence of presentations of learning exemplars and test instances, to be discussed shortly. The type of verification feature (i.e., consistent/inconsistent, etc.) and the specific learning exemplars associated with the latter, were treated as within-subjects variables for purposes of investigating H1 and H1A predictions. Table 4-38 shows the experimental design framework that was employed for each of the four studies. Studies 3 and 4 (i.e., alcoholic beverages and houses) involved two verification features per learning exemplar (i.e., irrelevant-true and irrelevant-false) rather than six. Figure 4-39 shows the design framework utilized to test H2 (i.e., categorization confidence and RT) in each of the studies.

The final consideration in the design framework was the issue of presentation sequences. It was believed that sequence effects might influence categorization strategies in the following manner: the format of presentation of exemplars (pictures/words) might influence the category acquisition strategy on the part of the respondents, which in turn might affect their categorization processes. Specifically, if a respondent is exposed to written copy material pertaining to an exemplar of a category at the beginning of the category learning phase, then analytic mechanisms might be activated in processing the information. This analytic orientation might then "carry-over" to other learning exemplars, even when they are presented

Table 4-38

Experimental Design (Dependent Measures: Verification Accuracy, Verification Reaction-Time, Verification Confidence, Similarity)

		QT1		QT2		QT3		QT1		QT2		QT3		QT1		QT2		QT3	
		T	F	T	F	T	F	T	F	T	F	T	F	T	F	T	F	T	F
S1	EBG																		
	RBG																		
S2	EBG																		
	RBG																		

Between Subjects

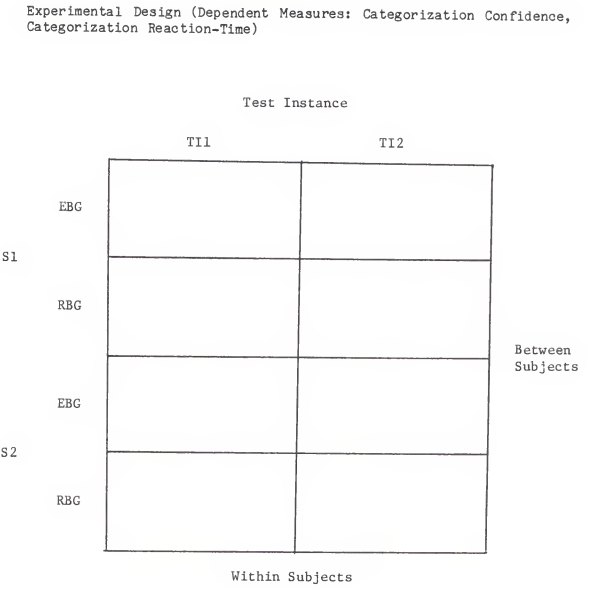
Within Subjects

---

index: LE1-LE3 -- category learning exemplars (3 in each acceptance category)
QT -- question type, i.e., consistent, inconsistent, and irrelevant (3 per learning exemplar, per category)
T/F -- true or false (2 per question type)
EBG/RBG -- category knowledge manipulation -- exemplar-based group/rule-based group
S1/S2 -- sequence of presentation of learning exemplars and test instances

Table 4-39

Experimental Design (Dependent Measures: Categorization Confidence, Categorization Reaction-Time)



---

index: TI1, TI2 -- test (to-be-cagegorized) instances
EBG/RBG -- category knowledge manipulation -- exemplar-based group/rule-based group
S1/S2 -- sequence of presentation of learning exemplars and test instances

pictorially (for example, subjects might focus attention on what they consider to be relevant attributes of an exemplar and ignore other, potentially individuating information). Such a sequence-based effect would then usurp the picture-word manipulation and potentially render both the EBG and RBG equivalent in terms of which aspects of a category are learned. In order to assess the influence of such a sequence effect, two sequences of presentation (i.e., of learning exemplars and test instances) were developed. In one of these, all subjects were first exposed to a word-only exemplar (vacation tour category) in the learning stage followed by pictorial exemplars from the other categories. In the second sequence, all subjects were first exposed to a pictorial exemplar. The order of presentation of exemplars within each sequence was guided by a simple constraint, i.e., no two exemplars from the same product class appeared consecutively. The successive order of the three pictorial categories (i.e., stores, alcohol and houses) either following the words-only tour exemplar (sequence 1) or preceeding it (sequence 2) was determined randomly. Also, such an order of presentation of categories was repeated successively in both sequences to accomodate all twelve learning exemplars. Sequence of presentation was thus utilized as a two-level between subject factor (see Table 4-40). Presentation of test instances in the categorization phase followed the product category order adopted

Table 4-40

Sequence of Presentation

	Sequence 1		Sequence 2	
Experimental Phase	Product Category	Presentation Mode	Product Category	Presentation Mode
Learning	Travel	Words	Store	Pictures
	Store	Pictures	House	Pictures
	House	Pictures	Alcohol	Pictures
	Alcohol	Pictures	Travel	Words
	Travel	Words	Store	Pictures
	Store	Pictures	House	Pictures
	House	Pictures	Alcohol	Pictures
	Alcohol	Pictures	Travel	Words
	Travel	Words	Store	Pictures
	Store	Pictures	House	Pictures
	House	Pictures	Alcohol	Pictures
	Alcohol	Pictures	Travel	Words
Categorization	Travel	Words	Store	Pictures
	Store	Pictures	House	Pictures
	House	Pictures	Alcohol	Pictures
	Alcohol	Pictures	Travel	Words
	Travel	Words	Store	Pictures
	Store	Pictures	House	Pictures
	House	Pictures	Alcohol	Pictures
	Alcohol	Pictures	Travel	Words

in the two learning sequences. The order of presentation of the categorization (and associated confidence) question, as well as the overall similarity questions followed the order of occurance of test instances in the categorization phase. The order of the verification questions was common for both sequences and determined randomly with one additional constraint: no two questions pertaining to the same exemplar appeared consecutively.

Concluding Comments on Methodology

As the previous discussion indicates, the methodology adopted for the experiment was quite complex and involved consideration of a number of issues. Generally speaking, there were four major areas that required significant attention a) selection of product categories for each of the four studies; b) choice of stimuli within each of these; c) appropriate measuring devices to test the conceptual hypotheses; d) creating an appropriate testing environment to investigate the nature of contingencies. While each of the hypotheses was viewed as important within the experimental framework, some prioritization of these may be warranted in light of the focus of this dissertation and its expected contributions. Referring back to Table 4-1, four types of hypotheses were investigated within each study. The first of these involved the verification-based

paradigm. The verification paradigm holds promise in being able to distinguish between contending categorization models. Such is potentially more valid than the traditional category judgment paradigm, but no published study has reported employing such a paradigm. A primary motivation for this investigation was to test the conceptual bases for the above paradigm. Thus, the indices based on verification (i.e., exemplar memorability) and their associated predictions take on added significance in this experiment and should be considered focal or central in all our endeavors. The other processing hypotheses were not derived from notions of exemplar memorability, but were viewed as consistent with the information processing underpinnings of the two models. Thus, they were viewed as potentially providing support to our focal measures. Category-judgment predictions were not explicitly incorporated in the hypotheses. Stimulus configurations in each of the studies were, however, believed to provide us with assessments of the validity of such a judgment outcome based methodology (i.e., through examining whether category assignments of the test instances in the four studies match the respective pretest patterns). While the stimuli were generally viewed as satisfactory for such purposes, the possibility of alternative characterizations of the latter (as evidenced through pretests) could render our assessment (i.e., either supporting or rejecting the paradigm as a whole) somewhat

problematic. Finally, the two contingent dimensions were viewed as providing the necessary manipulations for purposes of activating different categorization mechanisms, in turn lending insights regarding the environment in which these processes might occur.

CHAPTER FIVE

RESULTS

In this chapter, the results of the experiment will be presented. The following order of presentation will be adopted i) results of the rule-learning manipulations for each of the four product classes (i.e., whether or not the RBG acquired the intended rules during the learning phase of the experiment); ii) a general overview of findings on the hypotheses (and associated predictions) across all the four studies; iii) discussions of results by each individual study; and iv) a summary of findings and conclusions. The above order of presentation is somewhat unconventional in the following sense: rather than first describing results of individual hypotheses and combining these at the end for purposes of drawing conclusions, an overview is presented at the beginning. This is because the four studies need to be seen as a whole to observe the general pattern of findings across the studies even though there are distinct design characteristics associated with these. We begin then by describing the results of the rule-learning manipulations that formed the basis of group differences (i.e., the RBG and the EBG) in the experiment.

Manipulation Check: Rule Learning by RBG Subjects

RBG subjects were informed about four specific rules that described each of the acceptance categories (i.e., the features that were used by each individual to determine if an instance would fit into their respective preference sets). The EBG, however, were not provided with such rules. Following exposure to each rule, RBG subjects were asked to write it down in their own words on a paper provided by the experimentor. These written answers were studied after the experiment to determine whether or not the rules were comprehended accurately, whether the feature/s associated with each rule was accurately described (as opposed to confusing it/them with other related or unrelated attributes) and whether the relationship between the features was accurately reflected. The coding scheme that was used consisted of three categories a) accurate descriptions (i.e., in terms of both feature identification and relationships); b) descriptions that contained mistakes in terms of either feature identification or relationship; and c) erroneous descriptions (i.e., those that included different features and relationships than those communicated). The same individual coded all the responses. Identification of responses in terms of the coding categories was relatively simple. Table 5-1 shows the percentages of responses in each of the three coding categories described above for each of the four product classes. As indicated in the table, RBG

Table 5-1

Manipulation Check: Rule Reporting by RBG Subjects

Category	Accurate[a] Descriptions (%)	Partially[b] Accurate Descriptions (%)	Erroneous[c] Descriptions (%)
Department Stores (Study 1)	88	4	6
Vacation Tours (Study 2)	90	2	10
Alcoholic Beverages (Study 3)	95	2	3
Houses (Study 4)	85	6	9

a -- described features and relationships accurately
b -- mistakes on either features or relationships
c -- mistakes on both features and relationships

respondents were by and large quite accurate in describing the rules. Thus, it was believed that the RBG had successfully comprehended the category-defining rules thereby setting up the basis for difference in category knowledge with the EBG. The next section provides an overview of the substantive findings on each of the hypotheses across all four studies.

Overall Summary of Results

Table 5-2 displays the pattern of results that was observed across the four studies with respect to all the hypotheses and their associated predictions. Five categories of indices (1-5) are used to depict the nature of findings. A conventional p-value of .05 has been used to determine statistical significance. The following sections summarize the findings by each of the hypotheses advanced in Chapter Three.

Verification Paradigm: H1 and H1(A)

As discussed earlier, three sets of dependent measures were utilized to determine differences in exemplar memorability arising from adoption of distinct categorization mechanisms (i.e., exemplar-nonanalytic by the EBG and rule-analytic by the RBG). There were verification accuracy, verification reaction

Table 5-2

Overall Summary of Results from the Four Studies

Study	Verification Paradigm H1								H1A	Other Processing Indices (H2, H3)			Category Judgment Predictions	Contingent Dimensions H4	H5
	P1	P2	P3	P4	P5	P6	P7	P8		P9	P10	P11			
1 Department Stores	2	1	3	2	2	3	3	3	3	1	1	1	5	4	4
2 Vacation Tours	3	3	3	3	3	3	3	3	3	2	1	1	5	5	4
3 Alcoholic Beverages		1	3		2	3	3	3	3	2	1	1	4	4	4
4 Residential Homes			3				3	3	3	2	1	1	5	5	5

H1 - H5 -- hypotheses investigated in the study (see Chapter Three)
P1 - P11 -- predictions
P1 -- EBG will be more accurate than the RBG for consistent-false features of past exemplars
P2 -- EBG will be more accurate than the RBG for inconsistent-true features of past exemplars
P3 -- EBG will be more accurate than the RBG for irrelevant features of past exemplars
P4 -- EBG will be faster than the RBG for consistent-false features of past exemplars
P5 -- EBG will be faster than the RBG for inconsistent-true features of past exemplars
P6 -- EBG will be faster than the RBG for irrelevant features of past exemplars
P7 -- RBG will be more confident in verifying relevant features of past exemplars than the EBG
P8 -- EBG will be more confident in verifying irrelevant features of past exemplars than the RBG
P9 -- RBG will be faster than the EBG in categorizing test instances
P10 -- RBG will be more confident than the EBG in categorizing test instances
P11 -- EBG will report more nonanalytic strategies than the RBG

1 -- statistically significant in predicted direction (cut-off, P = .05)
2 -- in the predicted direction and approaching statistical significance
3 -- null results
4 -- predicted pattern observed
5 -- predicted pattern not observed

time, and verification confidence. Within each of these, group differences (i.e., EBG/RBG) were predicted for three types of to-be-verified features of past exemplars (i.e., consistent-false, inconsistent-true, and irrelevant). Table 5-2 provides brief descriptions of these predictions (P1-P8) while more detailed treatment of these is included in Chapter Four.

In study 1 and 3 the EBG was more accurate than the RBG in verifying inconsistent-false features. In study 1 the group difference on consistent-false features was in the predicted direction but only approached statistical significance. In study 2, where both the category-learning exemplars as well as the test (to-be-categorized) instances were presented through words, the predicted group differences did not materialize. Study 4 did not include consistent-false or inconsistent-true features in the verification set allowing us to test P1 and P2. Across all four studies, both groups performed with equivalent accuracies in verifying irrelevant features of past exemplars, contrary to prediction P3. In summary, investigation of verification accuracies showed that predicted patterns emerged for consistent-false and inconsistent-true features of past exemplars in two of the three product categories where such were present. Further, both these categories were characterized by pictorial presentation of exemplars and test instances. In the third product category (study 2) where the presentation of exemplars

and instances was exclusively through words, verification accuracy differences for the above two types of features did not materialize. Also, accuracy predictions on irrelevant features were systematically disconfirmed. Group differences similar to the above were also predicted for verification latencies pertaining to the three types of verification features. The EBG was found to be somewhat faster than the RBG for consistent-false and inconsistent-true features in study 1 and for the single inconsistent-true feature in study 3, although these group differences failed to attain statistical significance. Predictions on verification latency for category-irrelevant features in all four studies, as well as for all remaining types of verification features in studies 2, failed to materialize. With respect to verification confidence, it was predicted that the EBG would express higher confidence than the RBG for the irrelevant features (P8), while the reverse would be true for category relevant features of past exemplars (i.e., both consistent and inconsistent, true as well as false). Results indicated that neither of these two predictions materialized in any of the four studies.

The predictions related to H1(A), i.e., the mediating role of perceived overall similarity between test instances and the respective set of learning exemplars failed to materialize in any of the four studies. That is, the level of such perceived

overall similarity did not significantly influence the difference between the EBG and the RBG in terms of the verification-based indices. Subsequent analysis, however, showed (to be presented later) that respondents perceived the learning exemplars from each of the acceptance categories equivalently similar to the respective test instances. Thus, conditions necessary to test this hypothesis were likely absent.

Other Processing Indices: H2, H3

The RBG was found to be faster than the EBG in categorizing the two test instances as predicted (P9) in each of the four studies. Differences between the two groups in categorization latency attained statistical significance in study 1. In the remaining study, the group difference approached but failed to achieve statistical significance. The RBG was also found to express higher levels of confidence in categorizing the test instances than the EBG. The above group difference was statistically significant in each of the studies and confirmed P10.

In accordance with hypothesis H3 (and P11), it was found that the EBG reported significantly more nonanalytic strategies (in the post-categorization questionnaire) than the RBG. Such was the case in all the studies. Respondents in both groups,

however, reported a greater proportion of analytic than nonanalytic strategies.

Category Judgment Predictions

Specific predictions were made in each of the studies with respect to the nature of category assignment of the two test instances (i.e., whether or not each was viewed as fitting the respective acceptance category). Specifically, stimuli were pretested to predict the nature of such judgment outcomes associated with a rule-analytic and an exemplar-nonanalytic process. The objective here was to ascertain if RBG judgments (of the test instances) matched the predictions for a rule-analytic process, and if the EBG judgments matched the exemplar-nonanalytic pattern of outcomes. Except for study 3 (alcoholic beverages), none of the remaining studies confirmed the category-judgment predictions set forth earlier. Further, observed patterns for the EBG and the RBG in these studies (i.e., 1, 2 and 4) did not seem to corroborate the predictions of alternative models of categorization (i.e., distinct from the above two models) that were identified as potential candidates through pretests (Pretest 4 of each study).

Contingent Dimensions: H4, H5

Conclusions on H4, that is, the nature of processing differences between the EBG and the RBG based on the type of category information possessed by each, were drawn through examination of the entire configuration of results observed in each study. The general confirmation of predictions on the key verification accuracy and latency measures for consistent-false and inconsistent-true features, as well as supporting evidence on other processing indices led us to conclude that H4 had been supported in study 1.[1] That is, here the EBG was believed to have adopted an exemplar-based nonanalytic, and the RBG, a rule-based analytic strategy in categorizing the test instances. Similar confirmations (albeit with some exceptions to be discussed later) led us to claim support for H4 in study 3. Patterns of results on the key verification measures and other processing indices, were found to disconfirm H4 in studies 2 and 4.

Hypothesis H5 (picture/word distinction in the presentation of learning and test instances) implied that processing differences between the EBG and the RBG would emerge as in the following: where both learning exemplars and test instances were

---

1. Disconfirmatory findings on some other measures (P3, P6, P7, P8, H1A) and their diagnostic value will be discussed in subsequent sections.

presented pictorially (studies 1, 3, 4), the EBG would adopt an exemplar-nonanalytic strategy. Such would be distinct from a rule-analytic mechanism that the RBG would likely adopt, as evidenced through performance differences on key verification-based and other measures (i.e., H1, H1A, H2, H3). Where the learning exemplars and test instances were presented though words, both the EBG and the RBG would adopt similar analytic mechanisms leading to equivalent performance on the above measures. An examination of the pattern of results on key indices (similar to that in H4) led us to conclude that processing differences, as predicted, had materialized in studies 1 and 3. Both of the latter were characterized by pictorial presentation forms and thus seemed to provide support for H5. In study 4, where a pictorial presentation format was also adopted, the predicted processing differences on the verification-based and other measures did not materialize. This led to a disconfirmation of H5 in this particular study. In study 4, exemplars and test instances were presented exclusively through words and hence processing differences as in the above were not expected between the two groups. As Table 5-2 indicates, the EBG and the RBG performed equivalently on all the verification-based indices, leading to the conclusion that as predicted by H5, processing differences between the groups did not materialize.

Additional Analysis

As described in Chapter Four, three additional types of information were obtained from each subject participating in the experiment. These were a) responses on a questionnaire designed to identify each individual's dominant processing style; b) prior familiarity with each of the four product classes utilized in the study; c) sex of the respondents.

The objective of the additional analysis was to determine whether or not individuals characterized by different types of processing styles, levels of prior familiarity, and of different sex (either by themselves, or in some combination with the investigated contingencies) adopted different categorization mechanisms. Key verification-based as well as the other processing indices were analyzed to ascertain the above effects. The key findings here (systematic across each of the four studies) was that subjects that described themselves as being nonanalytic reported fewer analytic and more nonanalytic strategies (i.e., in post-categorization self reports) than those who described themselves as being analytic. The above, however, was observed only among the EBG, but not the RBG, where both analytic as well as nonanalytic processors reported equivalent and significantly large percentages of analytic strategies. It thus appears that categorization environments that are relatively free of strategic task orientations (as in the EBG) lead to some

degree of consistency between processing predispositions and adopted strategies (as evidenced through self reports). When specific processing cues are present in the environment, however, (e.g., anticipations of an analytic task for the RBG) such orientations may be replaced by more compatible mechanisms. The above also corroborates the notion that individuals might be quite flexible in adopting different information processing strategies based on the nature of cues present in the environment. Processing preference rather than processing ability, then, might prove to be more relevant in investigating differences in processing (see discussion on individual's processing styles in Chapter Two). Differences in processing styles, however, did not systematically influence other processing indices in the four studies. Also, prior familiarity with the relevant product classes, and the sex of the respondent, did not influence performance on the key verification or other processing indices utilized in the experiment.

In the next sections, each of the four studies will be presented successively. Besides presenting the statistical analysis and results in more detail, attempts will be made to provide explanations for both disconfirmatory findings and unexpected relationships (if any).

Study 1: Department Stores

Study 1 was characterized by the following distinguishing aspects. First, the choice of the particular product category (i.e., department stores) was guided by our intuitive notion that subjects possessed fairly significant numbers of concrete instances as well as rules based on their prior interactions in this product class. The category-knowledge manipulation (i.e., providing specific exemplars to the EBG and exemplars plus a rule to the RBG) was thus viewed as critical since all our predictions were based solely on information acquired by subjects during the course of the study. Second, all learning exemplars as well as test instances were presented pictorially thus setting up favorable conditions for observing differences between rule-analytic and exemplar-nonanalytic categorization models.

In the following section, an overview of the results is presented, followed by more detailed description of the analysis on individual measures.

Overview

Table 5-3 provides a summary of findings on each of the hypotheses and their associated predictions. As discussed in the concluding section of Chapter Four, the measures of the verification paradigm constituted the key processing indices in

Table 5-3

Summary of Results from Study 1

Verification Paradigm H1									Other Processing Indices (H2, H3)		Contingent Dimensions	
P1	P2	P3	P4	P5	P6	P7	P8	H1A	P9	P10 P11	Category Judgment Predictions	H4 H5
Predictions confirmed directionally, approaching statistical significance	Predictions confirmed with statistical significance	Predictions unconfirmed	Predictions confirmed directionally, approaching statistical significance		Predictions unconfirmed				Predictions confirmed with statistical significance		Predictions unconfirmed	Predictions confirmed

H1 - H5 -- hypotheses investigated in the study (see Chapter Three)
P1 - P11 -- predictions
P1 -- EBG will be more accurate than the RBG for consistent-false features of past exemplars
P2 -- EBG will be more accurate than the RBG for inconsistent-true features of past exemplars
P3 -- EBG will be more accurate than the RBG for irrelevant features of past exemplars
P4 -- EBG will be faster than the RBG for consistent-false features of past exemplars
P5 -- EBG will be faster than the RBG for inconsistent-true features of past exemplars
P6 -- EBG will be faster than the RBG for irrelevant features of past exemplars
P7 -- RBG will be more confident in verifying relevant features of past exemplars than the EBG
P8 -- EBG will be more confident in verifying irrelevant features of past exemplars than the RBG
P9 -- RBG will be faster than the EBG in categorizing test instances
P10 -- RBG will be more confident than the EBG in categorizing test instances
P11 -- EBG will report more nonanalytic strategies than the RBG

this study. Three types of verification features, consistent-false, inconsistent-true and irrelevant (true and false) were considered to be most sensitive in differentiating between a rule-based analytic and an exemplar-based nonanalytic process. Results on these key indices were somewhat mixed in this study. In terms of verification accuracy, the predicted group difference (i.e., between EBG and RBG) for the inconsistent-true features of past exemplars was statistically significant. Verification accuracy was close to significance ($P = .10$) for the consistent-false features. Group differences were insignificant for category irrelevant features (both true and false). In terms of verification latencies, group differences for consistent-false and inconsistent-true features were in the predicted direction but failed to attain statistical significance ($P = .2$ and $P = .3$ respectively) while those for irrelevant features were also insignificant. The difference between the EBG and the RBG on verification confidences were insignificant for both category relevant (i.e., consistent-true/false and inconsistent-true/false considered together) as well as irrelevant features. Thus, three issues germane to an assessment of H1 in this study warrant attention: a) weakness of predicted relationship (i.e., on verification accuracy for consistent-false features and on verification latencies for consistent-false and inconsistent-true features); b) lack of findings (on both accuracy and latency) for

irrelevant features; c) lack of findings on the verification confidence indices. Each one of the above will be considered in detail and potential explanations offered during discussion of the relevant processing indices in subsequent sections.

Hypothesis H1A, pertaining to perceived overall similarity between test instances and learning exemplars and its mediating influence on exemplar memorability indices (i.e., verification accuracy, latency and confidence), was unsupported. Further, it was found that the EBG perceived each of the three learning exemplars to be reasonably similar in an overall sense to either one or both test instances. With such restricted variance in overall similarity (i.e., the absence of exemplars viewed as extremely similar or dissimilar to test instances) conditions for detecting potential moderating influences were probably absent. Thus, it was believed that H1A was not adequately tested in this study.

The RBG was found to be significantly faster and more confident in categorizing the test instances than the EBG, supporting H2. Also, the EBG reported adopting a higher proportion of nonanalytic strategies (i.e., in self reports) than the RBG, confirming H3. Thus, the hypotheses pertaining to the processing indices different from the verification measures were supported in the study.

The observed category-judgment outcomes did not confirm the expectations based on pretest findings reported earlier.

Briefly, it was expected that the RBG would judge both the test instances (the stores showing cosmetics and antiques) to be ambiguous in terms of membership in the acceptance category (Mrs. Smith's preferred set of stores). That is, the number of acceptance and rejection judgments among the RBG was expected to be about equal. The basis for such an expectation was that Pretest 3 (Table 4-7) subjects had explicitly used the given rule in examining both the test instances and determined that neither completely satisfied both the necessary features of the rule; but neither did they demonstrate complete absence of both the rule-features. The EBG was expected to judge one of the test instances as fitting the acceptance category, and the other as being ambiguous with respect to the latter. The basis for this was the overall-similarity ratings observed in Pretest 3 (Table 4-8). Here, the cosmetics store (test instance 1) was found to be quite similar to each of the three learning exemplars (proportion of similar to not similar ratings were about 70-30). The antiques store (test instance 2) was found to be neither similar nor dissimilar to learning exemplars (proportion of similar to dissimilar ratings were about 50/50). The RBG in the study was expected to judge the test instances similarly to pretest 3 subjects that used the rule, while the EBG judgments were expected to parallel these of overall similarity. In the study, however, both the EBG and the RBG were found to judge both

test instances similarly and as generally fitting the acceptance category. Potential explanations for such will be offered in the more detailed discussion.

Both the hypotheses pertaining to processing contingencies (H4 and H5) were supported in the study. Assessment of H4 (i.e., difference in the form of category knowledge) involved reviewing the evidence on the key verification measures and other processing indices as well as weighing the discomfirmatory findings and their possible explanations. Generally speaking, it was concluded that the EBG and the RBG adopted distinct categorization mechanisms as evidenced through the various indices despite some weakness in design and procedures that might have led to emergence of a sharper distinction. In a related fashion, H5 (i.e., picture/word distinction in the presentation of exemplars and test instances) received some support (note that confirmation of H5 is contingent on comparison of results between studies that use both types of presentation formats). Since pictorial presentations were relied on exclusively in this study, the EBG was expected to adopt an exemplar-nonanalytic strategy. Such, it was believed, would be different from a rule-analytic process likely to be adopted by the RBG. Our assessment procedure and general conclusions on H4 simultaneously led us to confirm that the above had indeed been the case.

In terms of analyses of the additional data, subjects that described themselves as being nonanalytic (on the processing

style questionnaire, Appendix C) were found to report fewer analytic, and more nonanalytic strategies than those that described themselves as being analytic. The above was observed only among the EBG, but not the RBG. No systematic relationships were detected with regard to subjects' prior familiarity with department stores as a class, or their sex.

In the following sections, the analysis pertaining to each hypothesis and prediction will be presented in more detail.

Verification Accuracy

The EBG was expected to be more accurate than the RBG in verifying three out of the six verification questions since exemplar-based nonanalytic processing should lead to greater memory for retrieved exemplars (during categorization of new instances). Rule-analytic processing (presumably adopted by the RBG) does not involve reference to past exemplars and hence should not exhibit such enhanced memorability. Three of the verification features (consistent-false, inconsistent-true, and irrelevant) were expected to be sensitive in reflecting such differences in processing, while the remaining ones were not. In statistical terminology, a triple order interaction was expected, that between group (EBG/RBG), question type (consistent/inconsistent/irrelevant) and true-false (presence or

absence of the feature). An analysis of variance was performed, using the experimental design framework presented in Chapter Four (Table 4-38) and as expected the triple-order interaction was found to be significant (P = .0001), no other significant effects whether predicted or not were observed. Table 5-4 displays the accuracy means of each group by the type of verification feature. The EBG was found to be more accurate than the RBG for five of the six verification features and the group means were equivalent for the remaining. A series of planned contracts revealed that the group difference in accuracy was statistically significant only for the inconsistent-true features (P = .02), and approached significance for the consistent-false features (P = .10). All other group differences were statistically insignificant.

Support for the verification accuracy predictions appears to be somewhat mixed. While performance differences on inconsistent-true and consistent-false features are confirmatory, explanations for weakness of findings on the latter (i.e., failure to achieve conventional significance standards) and for lack of any effect on irrelevant features, are in order. The most immediate speculation that might be offered regarding the first of these issues is as follows: the memory load to which the EBG was subjected in this experiment prevented superior performance with respect to retrieving past exemplars of the category. All four studies were included within a single

Table 5-4

Study 1: Verification Accuracy Means

Type of Verification Feature	RBG	EBG	P Value of Group Difference
Category Consistent-True	.55	.58	.54
Category Consistent-False	.43	.50	.10
Category Inconsistent-True	.50	.60	.02
Category Inconsistent-False	.77	.77	1.00
Category Irrelevant-True	.60	.61	.93
Category Irrelevant-False	.48	.52	.46

procedure and all subjects viewed a total of twelve learning exemplars (three per acceptance category associated with each study), plus eight test instances (two per study). Thus, the verification task involved selectively retrieving a specific exemplar (i.e., the one on which the verification question was based) from a total of twenty exemplars viewed in the recent past. Even though the EBG might have benefitted from exemplar rehearsal during categorization, the above task might have taxed processing capabilities and led to some confusion among exemplars, but no direct evidence is available to support such an explanation.

The more critical issue in our current discussion concerns the lack of findings on irrelevant features. The notion behind predicting differences here was that when an exemplar is retrieved for purposes of comparison, all its consistent features (whether relevant to a rule or not) are simultaneously rehearsed. Thus, the EBG should be similarly accurate in verifying features that are rule-irrelevant, as those that are relevant (i.e., consistent and inconsistent features). This would be so if the irrelevant features are chosen such that they are comparable in terms of their salience to the other types of features. As Table 4-10 indicates, this was indeed the case (i.e., the average accuracy for irrelevant features in Pretest 5 was 63%, while that for all other types combined was 65%). The above findings suggest that the matter might be more complicated. In other words, properties other than the level of salience alone might

contribute to the relative strength associated with each feature in an exemplar representation. Going back to concepts of Gestalt formation in memory, it might be speculated that the degree of interrelatedness among features, the degree of centrality to the experience of the exemplar, etc., might influence the relative strengths of memory traces, in addition to the salience associated with each feature. In this study, only the latter was focussed upon, but the above mentioned characteristics were not taken into account. Thus, it could have been the case that features characterized as irrelevant in the study differed from those consistent or inconsistent in terms of properties such as "interrelatedness," etc., that in turn led to weaker memory traces. Exemplar rehearsal during categorization thus failed to substantially enhance memory for irrelevant aspects over rule-analytic processing. Considerations such as these, then, suggest the need for future research that explicitly conceptualizes and manipulates different properties of features (i.e., rule relevance/irrelevance, salience, centrality, relatedness, etc.), towards understanding their roles in exemplar representations and exemplar-based processing. The above discussion is also relevant for similar findings in the other studies and will be referenced in appropriate sections.

In summary, then, the verification accuracy results were generally supportive of the premises of H1, subject to the above caveats.

Verification Latency

As with verification accuracy, the central focus of our analysis here was the triple-order interaction involving the two groups and the six different types of verification features. The EBG was expected to be faster than the RBG in verifying three types of verification features (consistent-false, inconsistent-true and irrelevant), and to perform equivalently to the RBG for the remaining three types. An analysis of variance revealed that the above interaction was statistically significant ($P = .0001$) and no other design affects achieved significance. Table 5-5 displays the relevant latency means. The EBG was found to be faster than the RBG for each of the six types of verification features, but none of the group differences attained the stipulated level of statistical significance. Only on consistent-false and inconsistent-true features did the difference in latency between the EBG and the RBG seem to approach standard significance levels ($P = .2$ and $P = .3$, respectively). The latency data was further analyzed using a normalization procedure. The motivation for the above was that some subjects might have differed significantly from others in terms of the speed of verification. High variance in the data, then, might have led to the low levels of statistical significance with respect to the group differences. The verification latencies for each subject were recomputed by

Table 5-5

Study 1: Verification Latency Means

Type of Verification Feature	RBG	EBG	P Value of Group Difference
Category Consistent-True	6.15	6.09	.81
Category Consistent-False	6.08	5.80	.28
Category Inconsistent-True	7.63	7.30	.33
Category Inconsistent-False	6.61	6.55	.93
Category Irrelevant-True	6.51	6.44	.80
Category Irrelevant-False	6.85	6.64	.59

subtracting out their mean reaction-times across the entire set of forty-eight verification questions and dividing by the standard deviation. Such normalized verification latencies were analyzed using a similar ANOVA framework, but no substantial differences in terms of the P-values of the relevant design factors from the previous (non-normalized) analysis were observed.

Here, too, as in verification accuracy, the issues pertaining to weakness of effects for the consistent-false and inconsistent-true features and the lack of findings on irrelevant features demand attention. With respect to the first, a similar explanation pertaining to memory load might be offered. That is, it might be speculated that the EBG might have been slower than expected since respondents had to selectively retrieve one out of twenty exemplars viewed in the recent past to verify the presence/absence of the feature in question. A different speculation is based on the selective use of different verification response strategies described earlier. Even though the EBG was expected to rely more on "memory scanning" than the RBG in verifying features of past exemplars (due to stronger memory for these after category judgments had been made) specific characteristics associated with some of these features might have led them to adopt a category-consistency/inconsistency based heuristic similar to the RBG. Specifically, if a particular

verification feature is viewed as highly consistent/inconsistent with the nature of the acceptance category, then even EBG respondents might be inclined to use the simpler heuristic rather than adopt the more effortful memory scanning procedure. Some support for such a speculation may be found by inspecting the latency means (Table 5-5). Reaction times for consistent-false features were shorter than all other feature types for both groups of respondents. Also, as evidenced in the accuracy means (Table 5-4), both groups demonstrated lower accuracies than in other types of features (the EBG responded with just 50% accuracy while that for the RBG was 43%). These, then, suggest that a mechanism different from memory scanning might have been adopted by the EBG for consistent-false questions. Such could be the case, if the degree of consistency of these features was extremely high, provoking the adoption of a simple category-based inference. The verification features were characterized as consistent/inconsistent/irrelevant, based on the judgment of the experimentor without soliciting subjects' perceptions of the same at any stage. Thus, it is difficult to assess if indeed the degree of consistency/inconsistency influenced EBG's response strategies for different verification features, foreshadowing any advantage that they might have with respect to memory for past exemplars. Besides the above, the format of the verification task that was employed (a set of forty-eight questions were

asked) might have also encouraged respondents (including the EBG) to use the simpler category-based heuristic. The above comments point at potential refinements of the operationalization of the verification paradigm with special attention towards the perceived demands of the tasks involved, as well as the perceived characteristics of the verification features. Such refinements could include reducing the load on memory by using fewer exemplars at different phases of the experiment. Also, rather than employing a verification task to assess memorability differences (which might provoke different strategies based on task and stimuli characteristics) a traditional free recall format could be utilized. In the latter, elicited features of past exemplars could be analyzed to determine whether or not the EBG and the RBG reported different types of features. These, along with other operational refinements, will be dealt with in more detail in the Summary and Conclusion sections.

With respect to null findings on irrelevant features, the tentative explanation offered in the previous section (i.e., for verification accuracy) seems to be germane here as well.

Verificiation Confidence

An analysis framework similar to the above two sets of measures was used here. The objective was to ascertain if the

RBG was superior in terms of verification confidence to the EBG for features that were characterized as relevant (i.e., consistent and inconsistent-true as well as false) and if the reverse was true for irrelevant features. Category-relevant features provided a basis for the RBG to deal with the verification task in a systematic way which could also be perceived as being a "rational" procedure. The EBG would have to scan memory and the potential for confusion with multiple exemplars might lead to lower confidence ratings. Such would not be true for irrelevant features where the basis for making category-based judgments was absent. Here, the EBG was expected to express greater confidence than the RBG as a function of enhanced memory for the exemplars. The group by question-type interaction germane to such an analysis was statistically insignificant ($P = .10$). The RBG was generally more confident than the EBG for both the above types of features, but neither of the group differences approached statistical significance. An explanation based on the nature of the experimental task might be advanced to explain why the RBG did not express significantly higherconfidencethan the EBG, for relevant features. If RBG respondents did indeed adopt a catetory-based heuristic in responding to these questions, then the possible sequence of such mental operations need to be considered in more detail. On encountering a verification feature, RBG respondents would have

to retrieve the relevant rule from the set of four learned during the study. Such retrieval would likely be followed by an assessment of whether the feature was consistent or inconsistent with the rule-based description of the category. Perceived inadequacies could occur at one or both of the above stages. Further, the degree of relationship of the feature to the category (which was not explicitly studied or manipulated) could be an issue, influencing how confidently such judgments are made. In other words, the EBG could have been prevented from expressing even higher levels of confidence due to the complexity associated with the task and/or the varying quality of verification features. No specific data are available to validate the above, which should be viewed as issues to which future research needs to attend.

For irrelevant features, no obvious explanation based on experimental particulars is available. Probably, the type of concern expressed in our earlier discussions of the accuracy and latency measures is relevant here as well.

In summary, analysis of verification confidences disconfirmed our predictions. While a number of explanations were offered, empirical substantiations of these are unavailable at this stage.

Moderating Influence of Overall Similarity

According to H1(A), it was expected that differences between the EBG and the RBG on exemplar-memorability indices (i.e., verification accuracy, latency, and confidence) would vary, depending upon the level of perceived overall similarity between the test instances and the learning exemplars. Specifically, it was believed that memorability enhancements for the EBG would be greater for those learning exemplars viewed as somewhat similar to one or both test instances than those viewed as extremely similar/dissimilar. The RBG, however, was not expected to demonstrate such a sensitivity. The following analysis plan was adopted: the overall similarity ratings of each subject were used to create three indices $S1^{*}$, $S2^{*}$, and $S3^{*}$. $S1^{*}$ was obtained by summing a subject's similarity judgments with respect to each of the two test-instances and one of the learning exemplars. This composite score was believed to reflect how similar (in an overall sense) the subject perceived this particular exemplar to be to the test instances as a set, and hence how likely it (i.e., the exemplar) would be to be retrieved and rehearsed during the categorizations. Exemplars with extremely high or low composite scores were not expected to be retrieved and/or rehearsed. Exemplar memorability differences (as evidenced through verification measures) were hence not expected for these. Exemplars that showed intermediate

similarity scores were, however, expected to benefit in terms of exemplar memorability. Similar to S1*, the other two composites were computed for each subject summing the respective similarity ratings. Next, S1* was included in an ANOVA framework, along with other design factors (e.g., group, sequence, etc.) to predict the individual's difference in performance across the set of verification features that were associated with this particular exemplar (i.e., for which S1* was computed). The above was conducted for each of the dependent measures, i.e., verification accuracy, latency, and confidence. Since we predicted that differences would emerge based on the level of the perceived similarity of the learning exemplar (i.e., S1*), the subject's group identification (i.e., EBG/RBG) and the type of feature involved (i.e., consistent/inconsistent/irrelevant-true/false), the $S1^*$ x group x question type interaction was the central focus for each of the measures; but, the above interaction failed to be significant for any of the dependent measures, nor were other (i.e., unanticipated) effects discovered in the analysis. A similar analysis was performed involving S2* and S3* and their respective verification measures. The triple-order interaction was insignificant here as well for each of the verification-based measures.

A potential explanation for the null findings may be sought be examining the means for each group (i.e., EBG/RBG) for each

test instance-learning exemplar comparison. Table 5-6 shows that mean overall-similarity ratings (S1-S6) were comparable between the groups. Further, the range of such ratings varied from 3.18 to 4.55 for the EBG (on a 1-7 scale, Table 4-11), and from 3.63 to 4.15 for the RBG. What this seems to indicate is that both groups, particularly the EBG, did not perceive any of the three learning exemplars to be either extremely similar or dissimilar to the test instances. That is, each of the learning exemplars was perceived to lie in an intermediate range of overall similarity and had about the same likelihood of being retrieved and rehearsed by the EBG during categorization of the test instances. Since our prediction based on H1(A) was contingent on observing both moderate, as well as extreme levels of overall similarity, it may be concluded that the hypothesis was not tested in this study.

Categorization Latency and Confidence

According to H2, it was expected that RBG would demonstrate faster categorization reaction-time and higher confidences than the EBG for both the test instances. In other words, a group main effect was expected for both these measures. Analysis of variance using a design framework as shown in Table 4-39, showed that such a group main effect was indeed statistically

Table 5-6

Study 1: Group Means for Overall Similarity Ratings Between Test and Learning Exemplars

Similarity	EBG	RBG
S1	3.18 (1.63)[a]	3.45 (1.93)
S2	4.28 (1.61)	3.92 (1.90)
S3	4.36 (1.73)	4.12 (2.00)
S4	3.40 (1.83)	3.65 (1.74)
S5	4.55 (1.79)	4.15 (1.82)
S6	3.77 (1.81)	3.63 (1.85)
S1*	6.58	7.10
S2*	8.83	8.07
S3*	8.13	7.76

a -- variance associated with the mean

S1 -- overall similarity between test item 1 and learning item 1
S2 -- overall similarity between test item 1 and learning item 2
S3 -- overall similarity between test item 1 and learning item 3
S4 -- overall similarity between test item 2 and learning item 1
S5 -- overall similarity between test item 2 and learning item 2
S6 -- overall similarity between test item 2 and learning item 3

S1* -- S1 + S4
S2* -- S2 + S5
S3* -- S3 + S6

significant for both categorization latency and confidence (P = 0.02 for latency, and P = .0001 for confidence). The EBG demonstrated significantly lower reaction-times as well as lower confidences than the RBG for both test instances. An unexpected finding for both sets of dependent measures was a significant sequence (i.e., of presentation of exemplars and test instances) x test instance interaction (P = .0001 for latency, and P = .002 for confidence). Table 5-7 shows the relevant group means. Test instance 2 (i.e., the store showing cosmetics) was associated with significantly higher reaction-time and lower confidence (across both groups) in sequence 2 than in sequence 1. Test instance 1 (i.e., the store showing antiques) fared similarly in both sequences in terms of latency and confidence. The above unanticipated interaction may be explained as arising out of the procedures adopted in the study. In sequence 2, test instance 2 was the target for the first categorization judgment for both groups of respondents out of a total of eight to-be-categorized instances. In sequence 1, it was associated with the sixty categorization judgment. Unfamiliarity with the task, the format of the question, as well as the keyboard, might have led to slower responses for test item 2 in sequence 2 than in sequence 1, when experience with the above might have reduced the associated response latencies. Consistent with the above pattern of results and the explanation, test item 2 was categorized with

Table 5-7

Study 1: Categorization Latency and Confidence Means by Sequence and Test Instance

	Categorization Reaction Time		Categorization Confidence	
	Test Instance 1	Test Instance 2	Test Instance 1	Test Instance 2
Sequence 1	7.62	5.58	5.53	5.90
Sequence 2	6.92	6.97	5.55	5.10

significantly lower confidence in sequence 2 than in sequence 1. Test instance 1 was the second categorization item in sequence 1 and fifth in sequence 2. Thus, inexperience with the task, etc., did not seem to affect their relative performances.

In summary, then, it appears that consistent with H2, rule-based analytic processing seemed to have led to faster and more confident category judgments than did exemplar-based nonanalytic processing under experimental conditions that facilitated such rule application.

Self-Reports

Based on H3, it was predicted that the EBG subjects would report using a broader range of categorization mechanisms including exemplar-based nonanalytic comparisons than the RBG. The latter was expected to report mostly analytic strategies, dominated by the specific rule that was acquired during the experiment. The self reports were solicited from subjects (both groups) at the end of the response phase. Essentially, they were asked to describe on what basis they decided that each of the test instance would/would not fit into Mrs. Smith's preferred set of stores (i.e., the relevant acceptance category). Table 4-12 shows the questionnaire that was used.

Testing the above predictions involved creating a coding scheme for the self reports. A reading of the self-reports

suggested that several different types of mechanisms involving both rule and exemplar usage, as well as analytic and nonanalytic comparisons could have been used. Accordingly, it was decided that the typology of categorization strategies, as described in Table 2-1, would be relied upon to develop the coding categories. That is, these were created to reflect various combinations of representational (i.e., rule/exemplar) and processing (i.e., analytic/nonanalytic) aspects in the reported mechanisms. Table 5-8 shows the coding scheme that was used. Code 1 represents self-reports in which subjects describe using the learned rule (i.e., for the acceptance category) analytically in making category judgments. Conceptually, then, it is similar to cell 4 of the matrix shown in Table 2-1, i.e., a deliberate mechanism involving analytic comparisons of the target (i.e., test instance) to a category-defining rule. Code 2 represents a similar rule-based analytic comparison, but one that involved a rule different from that communicated to the RBG, i.e., one potentially induced by the subject. Code 3 represents an analytic (i.e., feature by feature) comparison between a test instance and a specific learning exemplar (i.e., exemplar-analytic comparison, cell 6, Table 2-1). Code 4 represents overall comparisons between a test instance and a learning exemplar/s (cell 12, Table 2-1). Code 5 was assigned when a subject did not report a strategy on the given questionnaire.

Table 5-8

Coding Scheme for Post Categorization Reports

Code	Type	Example
1	Use of the category defining featural rule communicated to RBG subjects in the learning phase.	"...the slide with cosmetics showed real high quality stuff. The environment was classy too. I believe Mrs. Smith looks for these two things."
2	Use of self-generated category defining featural rule.	"...the cosmetic store looked modern. She likes to shop in modern stores."
3	Use of feature-based comparison between the test item and a specific learning exemplar.	"The jewelry store had marble pillars. I thought she would like this because she likes going to this shoe store that has high decorated pillars, also."
4	Use overall similarity comparison to specific exemplar/s.	"...the jewelry ad did not seem like the other jewelry store she shops in. I think she wouldn't like this one."
5	No response.	

Table 5-9 shows the percentages of responses in each of the coding categories. In addition to the above categories, the percentage of responses for each group (i.e., EBG/RBG) in terms of reported analytic and nonanalytic strategies has also been displayed. The former was obtained by combining percentages in codes 1-3, while the latter is the same as in code 4.

As Table 5-9 shows, the EBG reported more exemplar-nonanalytic comparisons (26% of total responses, for both test instances) than the RBG (average of 4.5%, considering the set of test instances). The above was confirmatory of the predictions following from H3. Also, the RBG subjects, as expected, reported predominantly an analytic strategy based on the specific rule learned by them during the study (i.e., code 1). In terms of response categories other than the two mentioned above, a significant difference between the two groups was observed only for code 2, i.e., analytic strategies than employed rules distinct from the one communicated to the RBG. EBG responses were characterized by large percentages in this category (for both test instances) far in excess of that for the RBG. Most common examples of such self-generated rules were single-feature category descriptors such as "upper class," "upscale," "chic," "classy," etc. These induced features seem to be significantly correlated to the two features that were included in the actual rule communicated to the RBG. In other words, stores that

Table 5-9

Study 1: Self-Reports on Categorization Strategies

	Test Instance 1					Test Instance 2					Analytic Reports[a]	Nonanalytic Reports[b]
	1	2	3	4	5	1	2	3	4	5		
EBG	0	68	5	26	1[c]	1	68	3	26	2	72[d]	26
RBG	85	12	1	1	1	91	0	1	8	0	95	4.5

1, 2, 3, 4, 5 -- codes for self-reports

1 -- analytic, based on learned rule

2 -- analytic, based on induced rule

3 -- analytic comparison between test instance and learning exemplar/s

4 -- nonanalytic comparison between test instance and learning exemplar/s

5 -- no response

a -- percentage of analytic reports (combining categories 1, 2, 3) considering both test instances

b -- percentage of nonanalytic reports (category 4) considering both test instances

c -- percentage out of 80 responses

d -- percentage out of 160 responses

possessed the latter, i.e., high quality merchandise and exclusive shopping environments could likely be considered as "upscale," "classy," etc. It is unclear, however, whether the EBG induced these single-feature category-defining rules during exposure to exemplars in the learning phase and used the same during the categorizations, or whether these reflect just a convenient way of verbalizing some "unknown" process.

As anticipated in our earlier discussion of the issue, both groups reported using more analytic than nonanalytic strategies. While this is not surprising for the RBG, explanations for such among the EBG could lie in the following: the view that analytic strategies are somehow "rational" and normative leading to reporting these even if adopted strategies had been otherwise (i.e., predominantly nonanalytic); or inability to describe nonanalytic mechanisms accurately and subsequent effort to represent these in terms of one or few "likely" criteria. In any event, preponderance of rule reports among the RBG, and significantly more nonanalytic reports by the EBG, was viewed as confirming hypothesis H3.

Category Judgments

As discussed earlier, no specific hypothesis was advanced regarding the nature of group differences for category judgments

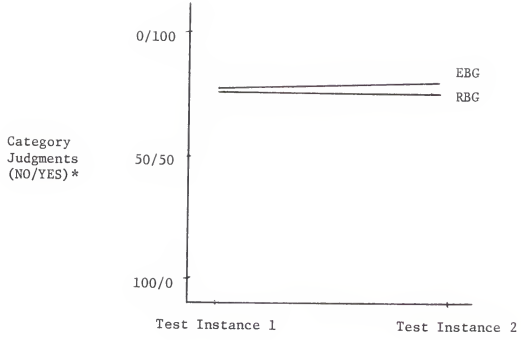
of the two test instances, but, the latter were chosen with specific rule and overall similarity properties. If a test instance was perceived as partially conforming to a rule that describes the acceptance category (for example) but dissimilar in an overall sense to learning exemplars from that category, then the two groups might categorize the instance differently. The RBG would probably view such an instance as somewhat ambiguous in terms of membership in the acceptance category. The EBG would probably reject it from membership in the same set. Such a difference in category judgments could then provide an indication of different categorization mechanisms by the two groups. Pretest 3 was conducted to create conditions for observing such differences. (See Tables 4-7 and 4-8.) Specifically, it was expected that the RBG would judge both test instances as ambiguous in terms of membership in the acceptance category (i.e., stores preferred by Mrs. Smith). The EBG was expected to judge test instance 1 as fitting and test instance 2 as being ambiguous. Thus, a group x test instance interaction was predicted.

An analysis of variance was conducted using a design framework similar to that shown in Table 4-39, i.e., considering group and sequence as between-subject and test-instance as a within-subject factor. The predicted group x test instance interaction was, however, found to be insignificant ($P = .47$),

nor did other effects (unanticipated) emerge in the analysis. Figure 5-1 shows the pattern of judgment outcomes. Both groups judged the two test instances similarly and as fitting the acceptance category quite satisfactorily. This disconfirmed our predictions and explanations to account for the findings were unavailable. Also, comparing the observed patterns to predicted outcomes of alternative models discovered in Pretest 4 (Figure 4-5) failed to provide any interesting insights regarding possible processing mechanisms.

Contingent Factor: Category Knowledge

Hypothesis H8 addresses the issue of the type of categorical knowledge available to an individual and the nature of categorization process adopted. Two types of categorical knowledge were investigated in the study. The EBG respondents were characterized by knowledge regarding category exemplars only, while the RBG was characterized by exemplar as well as category-defining featural rule knowledge. The expectation was that the groups would differ on key verificiation-based and other processing indices in the predicted directions (H1-H3) to warrant a confirmation of the above hypothesis. Accordingly, the focus was on the summary table 5-3 presented at the beginning of this study. Table 5-3 shows that a) four of eight verification-based



---

* NO/YES -- proportion of nonacceptance/acceptance judgments in terms of the learning set

Figure 5-1

Study 1: Pattern of Category Judgment Outcomes

measures were confirmed in a directional sense with varying levels of statistical significance; b) four of the remaining verification-based measures that were unconfirmed, all pertaining to irrelevant features that appeared to lack adequate conceptual and operational treatment in the study; and c) all three predictions on supporting processing indices were confirmed.

The configuration of results obtained on the set of measures was believed to provide reasonable support for H3. That is, the findings that EBG respondents a) were more accurate in verifying consistent-false and inconsistent-true questions; b) took less time in verifying the latter question types than the RBG seemed to support the notion that categorization processing differences between the two groups had been real and consistent with the type of category knowledge possessed by them in the study; c) took more time in categorizing; d) expressed less confidence in their category judgments; and e) reported using more nonanalytic strategies, seemed to support the notion that categorization processing differences between the two groups had been real and consistent with the type of category knowledge possessed by them in the study. Actual category judgment outcomes for the groups were invariant and explanations for such were unavailable.

Contingent Factor: Form of Exemplar Presentation

According to H5, it was expected that the pictorial form of presentation of learning exemplars and test instances would encourage the EBG to adopt exemplar-based nonanalytic comparisons during categorization. The RBG was expected to engage in rule-analytic processing as the process of rule learning would likely create perceptions of task requirements involving rule usage. Thus, the groups were expected to adopt different processing strategies and to reflect these in the key verification-based and other processing indices (consistent with H1-H3). The configuration of results and potential explanations for disconfirmatory findings led us to conclude that the form of presentation of exemplars and instances in this study influenced the EBG into adopting exemplar-nonanalytic processes distinct from the rule-analytic strategies of the RBG. However, conclusions on H5 need to be deferred till discussion of study 2, where exemplars and test instances were both presented through words. Comparison of EBG performance (compared to the RBG) between these studies would allow us to draw more specific conclusions with respect to H5.

Additional Data

Three types of additional information were collected in the study. These pertained to a) each subject's preferred processing

style; b) subject's past familiarity with department stores as a product class; and c) sex of each respondent. Analyses pertaining to each of these will be presented in the following sections.

Preferred processing styles

An individual's preferred processing style (i.e., analytic or nonanalytic) was expected to influence his/her adoption of either a rule-analytic or an exemplar-nonanalytic process. Further, such a relationship between preferred processing style and adopted categorization mechanisms was expected for the EBG but not for the RBG. This is because rule learning and subsequent perceptions of task requirements were believed to override natural processing proclivities among the RBG. For the EBG, where such conditions were absent, the described relationship was expected to emerge.

Subjects in both conditions were asked to respond to a twelve item questionnaire at the end of the experiment. The items in the questionnaire were arrived at intuitively and consideration of related instruments. Detailed considerations (i.e., validation) pertaining to the latter were not undertaken. Accordingly, the data collection and analysis pertaining to the above should be viewed as being exploratory in nature. The

analysis plan included the following steps. First, the items of the procuring preference scale were analyzed using the reliability procedure of SPSS which provided inter-item correlation, item-to-total correlations and Cronbach's . Second, a composite score was computed for each subject, including responses on items that were retained based on the previous analysis. Based on the distribution of such composite scores across the pool of respondents, each subject was classified as being analytic, nonanalytic or intermediate in terms of his/her processing preference. Third, the above subject factor (i.e., analytic/nonanalytic/intermediate) was included in an ANOVA framework, along with other design factors, to investigate processing differences on the set of processing indices employed in the study. Fourth, in addition to the previous steps, a more detailed analysis was conducted, involving subjects' self reports of processing strategies. Groups of respondents were identified who demonstrated consistent characteristics (i.e., nonanalytic processing preferences and reported nonanalytic strategies, and analytic processing preferences and reported analytic strategies). Performance on the key indices were compared between these two groups.

Results indicated that three of the twelve scale items were weakly related to other items and the total score. Deletion of these items, led to improvement of the reliability coefficient to

a value of .56. This was considered somewhat low for our purposes.[2] In lieu of opportunities for improving the same, steps two through four were performed. The key finding in step three was that subjects classified as nonanalytic in terms of their processing preference, reported fewer analytic and more analytic strategies than those classified as being analytic. The above was true only for the EBG but not for the RBG (Table 5-10). The interaction between the processing style classification of a subject and his/her group membership (i.e., EBG/RBG), failed to attain significance for any of the verification measures or the categorization latency and confidence indices. Neither did performance on these measures vary significantly between respondents characterized as consistent in terms of their expressed processing preferences and reported strategies. Thus, it was concluded that while investigation of processing styles revealed some interesting insights (i.e., the consistency relationship vis-a-vis self reports), the full range of its potential influence was undetected in this study and remains a candidate for more careful investigation in future research.

---

2. Nunnaly (1978) indicates an internal consistency reliability of .60 as being adequate for exploratory purposes.

Table 5-10

Study 1: Relationship between Preferred Styles and Self-Reports

Preferred Style	EBG		RBG	
	Analytic Strategies[a]	Nonanalytic Strategies[b]	Analytic Strategies	Nonanalytic Strategies
Analytic	92	7*	97	3
Somewhat Analytic, Somewhat Nonanalytic	77	19	96	3
Nonanalytic	65	29	94	5

a -- percentage of analytic self-reports, out of total number of reports on both test instances (obtained by combining self-report codes 1, 2, 3, Table 5-8)

b -- percentage of nonanalytic self-reports, out of total number of reports on both test instances (code 4, Table 5-8)

* -- note, rows don't add to 100%, due to some nonresponses

Product class familiarity

Each subject's prior familiarity with department stores as a class was solicited using a questionnaire shown in Appendix D. Prior familiarity (very familiar, reasonably familiar, and not at all familiar) was used, along with other design factors to explain variance on the processing indices utilized in the study. All relevant interactions (familiarity x group x question type for verification-based, and familiarity x group for other processing indices) were found to be insignificant.

Sex

Subjects were blocked based on their sex, and the analyses pertaining to the processing indices (H1 - H3, and category judgments) were conducted for both males and females, but no significant differences were observed on the above.

The above concludes the presentation of results for study 1. In the next section, the findings from study 2 will be presented.

Study 2: Vacation Tours

Study 2 was characterized by the following distinguishing aspects. First, the choice of vacation tours as a product class

was guided by our intuition that experimental subjects had few past interactions or rules regarding these in memory. The category-defining rule and exemplars learned during the study were hence expected to play a major role in determining the nature of categorization processes adopted by subjects. Second, all learning exemplars as well as test instances were presented in terms of written descriptions. Our understanding of the relationship between the form of presentation of exemplars and categorization mechanisms (see Chapter Three), led us to expect that analytic mechanisms might predominate among subjects of both groups (EBG/RBG). The latter is viewed as an important consideration in following the discussion of findings in the sections to follow.

Overview

Table 5-11 provides a summary of findings on each of the hypotheses and their associated predictions. As is evident from this table, none of the nine predictions pertaining to the verification-based paradigm were confirmed. In other words, the EBG and the RBG performed equivalently in terms of verification accuracy, latency, and confidence for the specified types of verification features. The mediating influence of overall similarity (H1A) was also undetected. Similar to study 1, it was

Table 5-11

Summary of Results from Study 2

Verification Paradigm (H1, H1A)									Other Processing Indices (H2, H3)			Category Judgment	Contingent Dimensions	
P1	P2	P3	P4	P5	P6	P7	P8	H1A	P9		P10 P11	Predictions	H4	H5
Predictions unconfirmed									Predictions confirmed directionally, approaching statistical significance		Predictions confirmed with statistical significance	Predictions unconfirmed	Predictions unconfirmed	Predictions confirmed

H1 - H5 -- hypotheses investigated in the study (see Chapter Three)
P1 - P11 -- predictions
P1 -- EBG will be more accurate than the RBG for consistent-false features of past exemplars
P2 -- EBG will be more accurate than the RBG for inconsistent-true features of past exemplars
P3 -- EBG will be more accurate than the RBG for irrelevant features of past exemplars
P4 -- EBG will be faster than the RBG for consistent-false features of past exemplars
P5 -- EBG will be faster than the RBG for inconsistent-true features of past exemplars
P6 -- EBG will be faster than the RBG for irrelevant features of past exemplars
P7 -- RBG will be more confident in verifying relevant features of past exemplars than the EBG
P8 -- EBG will be more confident in verifying irrelevant features of past exemplars than the RBG
P9 -- RBG will be faster than the EBG in categorizing test instances
P10 -- RBG will be more confident than the EBG in categorizing test instances
P11 -- EBG will report more nonanalytic strategies than the RBG

found that the EBG perceived each of the three learning exemplars to be somewhat similar (in an overall sense) to the set of test instances. The lack of appropriate conditions (i.e., extreme ratings of overall similarity) was hence considered to have thwarted testing of this hypothesis.

Findings on other processing indices (H2, H3) were by and large confirmatory of our predictions. The RBG was found to be faster than the EBG in categorizing the test instance. The group difference approached but failed to attain statistical significance ($P = .08$). The RBG also expressed significantly greater confidence than the EBG in categorizing the test set ($P = .01$). An examination of the self-reports revealed that while the RBG relied exclusively on the learned rule, the EBG reported a significant percentage of nonanalytic strategies (34%).

The observed category judgment-outcomes did not confirm the expected pattern based on pretest findings. Based on their respective rules and overall similarity characteristics established through pretests 1 - 3 (Tables 4-17 - 4-18), both test instances were expected to be judged as ambiguous (i.e., in terms of fitting the acceptance category) by the EBG. The RBG was expected to judge test instance 1 as being ambiguous and test instance 2 as not filling the acceptance category. RBG subjects in the study, however, judged both test instances similarly as

being ambiguous with respect to the learning set. The EBG judged instance 1 as being ambiguous and instance 2 as fitting the category. No explanations for the above findings were apparent either in terms of study procedures or alternate models that subjects could have developed based on their experience with exemplars in the study.

Assessment of H4, i.e., the potential influence of type of category knowledge involved a similar procedure of examining the configuration of findings on the array of measures. The important issue here was the contradiction in findings between the key verification-based measures and those on the other processing indices. Failure to realize even a single prediction on the former implied that expected processing differences between the two groups had not materialized in this study. Categorization-related performances (i.e., latency, confidence, self reports) seemed to point in favor of such differences. In view of the centrality of the verification-based indices in this investigation, the latter were believed to be of greater diagnostic value than the supporting measures. Accordingly, it was inferred that failure to observe differences in terms of memorability for past exemplars of the category reflects adoption of common processing mechanisms by the two groups. Such mechanisms were probably analytic in nature. While the RBG was believed to have predominantly used the learned rule (as

evidenced by the self reports), the EBG was believed to have been influenced by the form of presentation of category instances (i.e., words only) into developing and using analytic mechanisms. The above mentioned contradiction (i.e., that between findings on key and supporting indices) might then be reconciled by the following potential explanation: the RBG in this study had the advantage of knowing a rule for the acceptance category which was communicated to them through formal procedures. The EBG were provoked to induce one through contingencies mentioned above. The difference in such rule-learning conditions led the EBG to be less confident in applying such an indicated rule during the categorizations. This also led to more deliberations during the categorization phase leading to slower reaction-times than the RBG. Performance differences on the categorization latency and confidence measures, then, probably do not reflect fundamentally different categorization mechanisms.

Comparisons between studies 1 and 2 that differed on presentation formats, seemed to suggest that a words-only presentation format had encouraged the EBG to process analytically while a picture-only presentation encouraged the EBG to undertake exemplar-nonanalytic processing. In the following sections, analyses pertaining to each of the hypotheses and dependent measures will be presented in more detail.

Verification Accuracy

The rationale for expecting processing differences between the two groups and the analysis plan for detecting the same, were identical to that in study 1. The critical group x question type x true-false interaction approached significance (P = .06). Planned comparisons revealed, however, that group differences were insignificant for each of the six verification features (Tables 5-12) thereby disconfirming predictions P1-P3. The explanation offered for null findings on irrelevant questions in study 1 might be invoked here. However, explanations are unavailable for failure to observe differences on consistent-false and inconsistent-true features.

Verification Latency

The group x question type x true-false interaction was significant (P = .03). Planned comparisons revealed, however, that group differences in latency were insignificant for each of the six verification features (Table 5-13). Again, no explanations based on procedural or stimuli characteristics were available for the above and predictions P4-P6 were rejected.

Table 5-12

Study 2: Verification Accuracy Means

Type of Verification Feature	RBG	EBG	P Value of Group Difference
Category Consistent-True	.58	.60	.14
Category Consistent-False	.55	.61	.21
Category Inconsistent-True	.64	.64	1.00
Category Inconsistent-False	.65	.65	1.00
Category Irrelevant-True	.59	.59	1.00
Category Irrelevant-False	.70	.71	.92

Table 5-13

Study 2: Verification Latency Means

Type of Verification Feature	RBG	EBG	P Value of Group Difference
Category Consistent-True	6.35	6.23	.46
Category Consistent-False	6.83	7.00	.42
Category Inconsistent-True	5.98	5.68	.56
Category Inconsistent-False	5.92	5.95	.41
Category Irrelevant-True	6.71	6.53	.16
Category Irrelevant-False	6.86	6.78	.29

Verification Confidence

As discussed in study 1, the group x question type (i.e., irrelevant/relevant) was the focus of the analysis. The latter was found to be statistically insignificant ($P = .91$). Nor were planned comparisons between the groups on relevant and irrelevant features significant ($P = .6$ and $P = .4$, respectively). Thus, predictions P7 and P8 were unconfirmed.

Mediating Influence of Overall Similarity

An analytical framework similar to that in study 1 was utilized here. As in study 1, the group x similarity interaction was insignificant for each type of verification feature and for each of the three verification indices--accuracy, latency and confidence. A similar pattern of means as in study 1 was observed here as well (Table 5-14). The combined overall similarity for each learning exemplar, varied from 7.41 to 8.21 for the EBG. That is, EBG subjects did not perceive any of the learning exemplars as being extremely similar or dissimilar to the set of test instances. Thus, conditions for testing H1A were presumed to be absent in this study.

Table 5-14

Study 2: Group Means for Overall Similarity Ratings Between Test and Learning Exemplars

Similarity	EBG	RBG
S1	3.49 (1.21)[a]	3.45 (1.93)
S2	3.56 (1.71)	3.91 (1.48)
S3	4.21 (1.79)	3.98 (1.21)
S4	3.91 (1.68)	4.41 (1.60)
S5	4.30 (1.90)	4.11 (1.71)
S6	4.00 (2.10)	3.40 (1.60)
S1*	7.41	7.86
S2*	7.86	8.02
S3*	8.21	7.38

a -- variance associated with the mean

S1 -- overall similarity between test item 1 and learning item 1
S2 -- overall similarity between test item 1 and learning item 2
S3 -- overall similarity between test item 1 and learning item 3
S4 -- overall similarity between test item 2 and learning item 1
S5 -- overall similarity between test item 2 and learning item 2
S6 -- overall similarity between test item 2 and learning item 3

S1* -- S1 + S4
S2* -- S2 + S5
S3* -- S3 + S6

Categorization Latency and Confidence

The RBG was predicted to be faster than the EBG in categorizing the test instances. The group main effect germane to the above approached statistical significance ($P = .08$). The RBG was faster than the EBG in categorizing both test instances. The RBG also expressed significantly greater confidence in categorizing the test set ($P = .01$). For both the above measures, the sequence x test instance interactions were found to be significant ($P = .005$ for latency, and $P = .001$ for confidence). Table 5-15 displays the means relevant to the above interactions. Test instance 1 (Iberian Sunseeker) was associated with significantly higher reaction time and lower confidence in sequence 1 than in sequence 2. The remaining means were more or less equivalent.

An experimental context-based explanation appears to underlie the significant interactions described above. In sequence 1, the test instance 1 was the first to-be-categorized item. Consequently, the first categorization confidence judgment was also associated with this test instance. The novelty of the categorization and confidence tasks in the context of the procedure might have led subjects in both groups to be slower and less confident in categorizing it. This might have been so compared to sequence 2, when the same test instance occurred as

Table 5-15

Study 2: Categorization Latency and Confidence Means by Sequence and Test Instance

	Categorization Reaction Time		Categorization Confidence	
	Test Instance 1	Test Instance 2	Test Instance 1	Test Instance 2
Sequence 1	8.15	6.08	4.26	5.28
Sequence 2	6.56	6.02	5.20	5.33

the eighth to-be-categorized item and uncertainties associated with the task format were no longer present.

The above findings indicate that hypothesis H2 was confirmed in the study. Inferences regarding the processing strategies adopted by the EBG and the RBG must be guarded, however, in light of the lack of findings on the key verification indices. As discussed in the overview, the differences on categorization latency and confidence might have arisen from different rule-learning conditions faced by the two groups (i.e., formal learning by the RBG, and induction by the EBG based on exposure to learning exemplars) rather than adoption of fundamentally different categorization mechanisms.

Self-Reports

The same coding scheme as in study 1 was utilized here. Table 5-16 shows the percentage of response in each coding category by group. The RBG self-reports were characterized by exclusive use (100%) of analytic strategies. The learned rule was reported most extensively by subjects (91% for test instance 1, and 96% for test instance 2). Such a heavy reliance on the learned rule, though expected, might also indicate subjects' limited prior interaction with this product class. Vacation tours were chosen with the intuitive notion that our subjects

Table 5-16

Study 2: Self-Reports on Categorization Strategies

	Test Instance 1					Test Instance 2					Analytic Reports[a]	Non-analytic Reports[b]
	1	2	3	4	5	1	2	3	4	5		
EBG	4	55	8	32	1[c]	6	51	5	35	3	64[d]	34
RBG	91	8	1	0	0	96	1	3	0	0	100	0

1, 2, 3, 4, 5 -- codes for self-reports

1 -- analytic, based on learned rule

2 -- analytic, based on induced rule

3 -- analytic comparison between test instance and learning exemplar/s

4 -- nonanalytic comparison between test instance and learning exemplar/s

5 -- no response

a -- percentage of analytic reports (combining categories 1, 2, 3) considering both test instances

b -- percentage of nonanalytic reports (category 4) considering both test instances

c -- percentage out of 80 responses

d -- percentage out of 160 responses

would probably possess few exemplars or rules about these prior to the experiment. They were hence expected to rely more strongly on category information acquired during the study than on that for other product classes. RBG's rule reporting pattern seems to confirm the above anticipation. The EBG reported a significant percentage (34%) of nonanalytic strategies confirming our predictions (P11). Here, too, as in study 1, the EBG reported more analytic (64%) than nonanalytic strategies and explanations similar to study 1 might be offered in this context. In our overview of this study findings, the EBG was speculated to have based their categorization judgments on self-induced rules. While the significant percentage of analytic responses support this, no specific rule/s were found to dominate the analytic responses (i.e., in code 2).

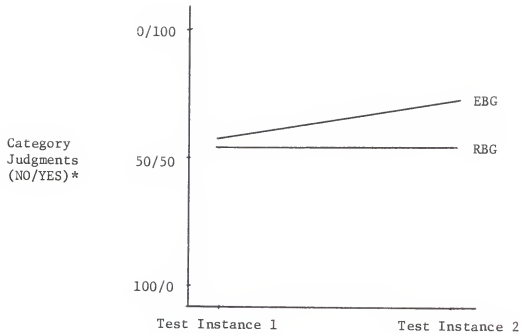
Category Judgments

The EBG and the RBG were expected to differ in terms of the category judgment of test instance 2 (i.e., the Mexico tour). This is because the latter was viewed by pretest subjects (Pretest 3, Table 4-17) as being inconsistent with the rule defining the acceptance category. Use of overall similarity to learning exemplars dictated that the same instance would be considered as fitting the acceptance category (Table 4-18).

Thus, the RBG was expected to reject and the EBG to accept this test instance as a member of the learning set (i.e., Mr. Jones' preferred set of tours). Test instance 1 (i.e., the Iberian Sunseeker tour) was expected to be judged as being ambiguous with respect to the learning set by both groups, based on its rule and similarity properties. The observed category judgments (Figure 5-2) did not confirm these predictions. Both groups judged instance 1 similarly, tending to accept the latter as fitting the category. Rather than rejecting instance 2, the RBG considered the latter to fit the category. The EBG expressed an even greater percentage of acceptance judgments than the RBG for this test instance. The observed outcomes did not correspond to other patterns that could have materialized if alternative models (as described in Figure 4-5) had been adopted by the subjects. Accordingly, explanations for the observed category-judgment findings were unavailable.

Contingent Factor: Category Knowledge

The inference regarding H4 was based on reconciling the conflicting findings between the verification indices and other processing measures. It was argued that the presentation of exemplars and test instances through words led the EBG to focus on specific attributes contained in the latter, and hence adopt



---

* NO/YES-- Proportion of nonacceptance/acceptance judgment in terms of the learning set.

Figure 5-2

Study 2: Pattern of Category Judgment Outcomes

an analytic orientation. Even though no specific feature-based rules were found to dominate their self-reports, the EBG likely induced such rules during the learning phase. During categorizations, these rules were probably utilized, albeit with lower confidence and with less speed than the RBG since there was no external validation of them. Thus, the form of presentation (a processing contingency) was believed to have overridden the relationship between type of category knowledge and adopted categorization mechanisms.

Contingent Factor: Form of Exemplar Presentation

The previous discussion led us to confirm H5. That is, the words-only presentation form was believed to have led to processing conditions that encouraged respondents (i.e., the EBG) into developing and using analytic categorization rules, even though such were not formally communicated to them. Combining the findings of studies 1 and 2, then, provides increasing support for the nature of influence of this contingent factor. The caveat in the above is that the two forms of presentation were associated with two different product categories, department stores and vacation tours. While conceptually, the two classes might differ in terms of certain process-contingent dimensions (e.g., the type and extent of information involved, etc.),

intuitively they were believed to be similarly multidimensional, providing opportunities for both analytic, as well as nonanalytic, processing. In other words, even though from a strictly experimental perspective one may not be able to rule out contending explanations for findings on the two studies (i.e., nonanalytic performance by EBG in study 1, and analytic performance in study 2), the difference in presentation form appears to be a strong and plausible basis.

Additional Data

As in study 1, additional analyses were conducted involving subjects' preferred processing styles, prior product class familiarity and sex. Within the EBG but not the RBG, subjects who described themselves as being nonanalytic, reported fewer analytic and more nonanalytic strategies than those that described themselves as being analytic in processing orientation (Table 5-17). It thus appears that categorization environments that are relatively free of strategic task orientations (as in the EBG) lead to some degree of correspondence between preferred processing styles and adopted strategies (as evidenced by self-reports). When specific processing cues are present (such as task anticipation among the RBG) preferred styles may be overridden in favor of more context compatible mechanisms.

Table 5-17

Study 2: Relationship Between Preferred Styles and Self-Reports among the RBG

Preferred Style	Analytic Strategies[a]	Nonanalytic Strategies[b]
Analytic	90*	9
Somewhat analytic, somewhat nonanalytic	84	14
Nonanalytic	70	27

a -- percentage of analytic self-reports, out of total number of reports on both test instances (obtained by combining self-report codes 1, 2, 3, Table 5-8)

b -- percentage of nonanalytic self-reports, out of total number of reports on both test instances (code 4, Table 5-8)

* -- note, rows don't add to 100%, due to some nonresponses

Similar to findings in study 1, relationships between prior product class familiarity or sex.

The above concludes the presentation of analyses and results for study 2. The following sections will be devoted to the discussion of study 3.

Study 3: Alcoholic Beverages

Study 3 was characterized by the following distinguishing aspects. First, experimental subjects were believed to possess memory characteristics somewhat intermediate between those in studies 1 and 2. That is, subjects were believed to possess some concrete instances (i.e., brands) and rules in this category as a function of prior experience. Such was speculated to be greater than that for vacation tours but less elaborate than in department stores. Consequently, some reliance on general category information, beyond that learned in the study, was anticipated. Second, all learning exemplars and test instances were presented pictorially setting up conditions for exemplar-nonanalytic processing particularly on the part of the EBG subjects. Third, only irrelevant features of past exemplars (both true and false) were included in the verification set. The choice of the latter was not conceptually motivated, but guided by our inability to identify verification features with high cue-

validities that could qualify them as being category consistent or inconsistent. These irrelevant features were viewed as appropriate in reflecting exemplar memorability differences consistent with the underpinnings of the competing categorization models.

Overview

Table 5-18 provides a summary of findings on each of the hypotheses and their associated predictions. Here, too, as in the previous studies, the groups were expected to perform differently on the key verification indices--derived from considerations of exemplar memorability. Since all the verification features used in this study were considered to be irrelevant to any category-defining rule, the EBG was expected to be more accurate than the RBG across the entire set of verification questions. Thus, a group main effect was predicted and was the central focus of the analysis of variance. While the EBG reported a somewhat higher mean accuracy than the RBG across the set of verification features, the group difference approached but failed to attain statistical significance ($P = .17$). Consideration of exemplar memorability differences also led us to predict that the EBG would be faster than the RBG for the set of verification features, i.e., a group main effect on latency. The

Table 5-18

Summary of Results from Study 3

Verification Paradigm (H1, H1A)				Other Processing Indices (H2, H3)		Category Judgment Predictions	Contingent Dimensions	
P1	P2	P3	H1A	P4	P5	P6		H4	H5
Predictions unconfirmed (significant findings on one potentially inconsistent-true feature)		Predictions unconfirmed		Predictions confirmed directionally, approaching statistical significance			Predictions confirmed	Predictions confirmed	

H1-H5 -- hypotheses investigated in the study (see Chapter Three)
P1-P6 -- predictions
P1 -- EBG will be more accurate than the RBG in verifying the irrelevant features of past exemplars
P2 -- EBG will be faster than the RBG in verifying the irrelevant features of past exemplars
P3 -- EBG will be more confident than the RBG in verifying the irrelevant features of past exemplars
P4 -- RBG will be faster than the EBG in categorizing the test instances
P5 -- RBG will be more confident than the EBG in categorizing the test instances
P6 -- EBG will report more nonanalytic strategies than the RBG

latter, however, was found to be insignificant (P = .91). The EBG was also expected to be more confident in verifying the irrelevant features of past exemplars than the RBG. Here, too, the predicted group main effect failed to materialize (P = .73).

Even though the predictions on key verification measures were unconfirmed, further insight into possible processing differences was found through examination of group means for two unanticipated interaction effects that attained or approached significance for both accuracy and latency measures. These were the group x learning exemplar (P = .05 for accuracy, and P = .06 for latency) and group x learning exemplar x question type effects (P = .2 for accuracy, and P = .005 for latency). Detailed analysis of these interactions seemed to indicate that rather than perceiving each of the verification features to be irrelevant, subjects might have perceived two of these as bearing an inconsistency relationship with the category of learning exemplars. The EBG was found to be more accurate and faster than the RBG in verifying the feature perceived (presumably) as inconsistent-true. For the inconsistent-false feature, both groups performed equivalently on the above measures. While there is no strong basis for inferring that subjects indeed perceived the two specific verification features differently than anticipated (i.e., as inconsistent rather than irrelevant), the consistency of findings on these lends some support to the notion

that exemplar memorability differences were indeed operative between the EBG and the RBG.

As in studies 1 and 2, the mediating influence of overall similarity (H1A) was undetected in this study. The mean similarities between each learning exemplar and the set of test instances were moderate (i.e., no extreme ratings were observed). Thus experimental conditions were viewed as inadequate in terms of subjecting the hypothesis to appropriate validation.

The RBG was found to be faster in categorizing the test instances, although the group difference approached but failed to attain significance ($P = .18$). The RBG was also significantly more confident than the EBG in their categorizations ($P = .02$). In terms of post categorization self-reports, the EBG described a significantly greater percentage of nonanalytic strategies (45%) than the RBG (0%). In summary, predictions based on the hypothesis pertaining to processing indices other than verification (H2, H3) were confirmed in this study.

The category-judgment predictions that were advanced based on stimulus characteristics observed in the pretests were realized in this study. This was a notable departure from studies 1 and 2 where such predictions were unrealized.

Even though predictions on key verification measures for irrelevant features were unconfirmed, H4 (i.e., influence of type of category knowledge) was confirmed. This is so because, first,

accuracy and latency differences were observed on one of the verification features presumably viewed as "inconsistent-true" by respondents. Such differences were consistent with the theoretical underpinnings of the rule-analytic and exemplar-nonanalytic models. Second, findings on categorization latency, confidence and self-reports were confirmatory. Third, observed category judgments confirmed predictions for the EBG and the RBG.

It also appeared that the pictorial presentation form had encouraged the EBG to adopt an exemplar-based nonanalytic process (H5).

In terms of analyses pertaining to the additional data, findings were similar to those in studies 1 and 2. Subjects describing themselves as being nonanalytic reported fewer analytic and more nonanalytic strategies than those describing themselves as being analytic. Prior familiarity with alcoholic beverages, and the sex of the respondent, were found to be unrelated to performance differences across the set of processing indices.

The following sections present the analysis and findings on each hypothesis and prediction in more detail.

Verification Accuracy

As discussed in the overview section of this study, the EBG was expected to be more accurate than the RBG across the set of

verification features which were believed to be irrelevant for purposes of any category definition of the learning exemplars. While the above group main effect failed to attain significance (P = .17), the group x learning exemplar interaction was significant (P = .05). The group x learning exemplar x question type interaction also approached significance. Table 5-19 shows the means relevant to the three effects described above. As Table 5-19a shows the EBG was slightly more accurate than the RBG, but the difference between the two was insignificant. Table 5-19b shows that while the two groups performed more or less equivalently with respect to verification of features associated with learning exemplar 1 and 2, the EBG was significantly more accurate than the RBG for features associated with exemplar 3 (P = .05). Table 5-19c displays the group means in more detail, i.e., by each type of question (true/false) per learning exemplar. A set of planned comparisons here revealed that only for the true feature associated with learning exemplar 3 was the difference in accuracy between the groups significant (P = .04). This led to an examination of the verification questions that were utilized in the study (Table 5-20, also in Appendix A). The to-be-verified features associated with exemplars 1 and 2 (i.e., candles, flowers, wooden cabinet, and color of the drink) appeared to be significantly removed from any rule that could be evoked to describe the three learning exemplars. Those related

Table 5-19

Mean Responses on Verification Accuracy a) By Group;
b) By Group x Learning Exemplar;
c) By Group x Learning Exemplar x Question Type

a)

Group	Mean
EBG	.60
RBG	.56

b)

Group	Learning Exemplar		
	1	2	3
EBG	.63	.61	.58
RBG	.65	.61	.46

c)

Group	Learning Exemplar 1		Learning Exemplar 2		Learning Exemplar 3	
	T[a]	F[b]	T	F	T	F
EBG	.52	.75	.46	.76	.61	.56
RBG	.48	.82	.50	.68	.45	.48

a -- true feature (i.e., associated with the exemplar)
b -- false feature (i.e., associated with the exemplar)
EBG -- exemplar-based group
RBG -- rule-based group

Table 5-20

Verification Features for Alcoholic Beverages Category

Learning Exemplar 1 (Baileys)

TRUE: The Baileys ad showed three candles reflecting off a glass panel at the rear.

FALSE: The Baileys ad showed a bunch of white flowers next to the gold-coloured box.

Learning Exemplar 2 (Cointreau)

TRUE: The Cointreau ad showed a drink that was light-coloured.

FALSE: The Cointreau ad showed the bottle sitting on the shelf of a wooden cabinet.

Learning Exemplar 3 (Hiram Walker)

TRUE: The Hiram Walker ad showed three glasses with ice in each one of them.

FALSE: The Hiram Walker ad showed an ice bucket next to the bottle and the glasses.

to learning exemplar 3 (the Hiram Walker brandy) appeared to be problematic (these are listed in Table 5-20). It was believed that these features might possess "inconsistency" relationships with the acceptance category, i.e., "after-dinner drinks". This may be so because liqueurs and brandy, the most common after-dinner drinks, are usually consumed without ice or mixers. If indeed such a belief is associated with the category of "after-dinner drinks" by the RBG (who were provided with this category label during the learning phase), then both the true and false features associated with the Hiram Walker ad might seem inconsistent with the acceptance category. This is because both these questions involved verifying the presence/absence of ice pictured in the ads. By our previous logic of response mechanisms to inconsistent questions it could then be predicted that RBG subjects would tend to respond negatively to both these verification questions, and that for the false question they would be more accurate than the true question. That is, for the latter, i.e., the inconsistent-true question, group differences (EBG/RBG) should be manifested more readily than for the false, i.e., inconsistent-false question. Our results precisely confirmed the above.

The lack of findings on five of the six verification features that were presumably viewed as irrelevant by the subjects might be explained similar to that in studies 1 and 2.

In summary, then, the insight afforded by the single diagnostic finding was viewed as encouraging and supportive of the logic of the verification-accuracy measures.

Verification Latency

As with verification accuracy, the predicted group main effect failed to materialize ($P = .19$), although the group x learning exemplar and the group x learning exemplar x question type interactions were significant. Table 5-21 displays the relevant group means. Planned comparisons revealed that latency differences between the EBG and RBG were significant ($P = .03$) only for the true features associated with learning exemplar 3 (i.e., the Hiram Walker brandy). This is consistent with the explanation offered with respect to the accuracy difference observed for the same verification feature. That is, the EBG was found to be significantly faster than the RBG in verifying this (presumably) "inconsistent-true" feature. For the remaining features (probably viewed as "irrelevant"), lack of findings might be attributed to similar considerations as in studies 1 and 2.

Verification Confidence

As planned originally, the EBG was expected to express greater confidence than the RBG in verifying all six irrelevant

Table 5-21

Mean Responses on Verification Reaction Time by Group x Learning Exemplar x Question Type

Group	Learning Exemplar 1		Learning Exemplar 2		Learning Exemplar 3	
	T[a]	F[b]	T	F	T	F
EBG	7.30	7.24	6.08	7.40	6.04	7.46
RBG	7.49	6.40	6.22	7.58	6.21	7.31

a -- true feature (i.e., associated with the exemplar)
b -- false feature (i.e., associated with the exemplar)
EBG -- exemplar-based group
RBG -- rule-based group

questions associated with three learning exemplars. The group main effect pertinent to the above failed to materialize ($P = .73$). In light of our speculation that two of the verification features might have been perceived as inconsistent (one true, the other false) by the subjects, the focus shifted to examining the group x question type (i.e., relevant/irrelevant) interaction, similar to that in studies 1 and 2. The latter interaction also failed to be significant ($P = .6$). Planned comparisons showed that both groups expressed equivalent levels of confidence for each of the six verification features. Prediction P3 thus appears to have been disconfirmed.

Moderating Influence of Overall Similarity

An analytical framework similar to those adopted in studies 1 and 2 was utilized. The findings too were similar to the previous studies. That is, the group x similarity interactions for accuracy, latency and confidence were insignificant for each of the verification features. The observed pattern of means (i.e., for overall similarities between each learning exemplar and the set of test instances) was also similar to the previous studies.

Categorization Latency and Confidence

The RBG was found to be faster than the EBG in categorizing both test instances, although the group main effect failed to attain significance (P = .18). The RBG also expressed significantly higher confidence in categorization than the EBG (P = .02). For both the above measures, significant sequence x test instance interactions were observed (P = .0001 for latency, and P = .05 for confidence). Table 5-22 displays the relevant means.

An experimental-context-based explanation appears to underly these significant interactions. Test instance 1 (the B&B brand) was the first categorization item from the alcohol category in sequence 1. In sequence 2, it was the second to-be-categorized instance from the alcohol category. The deliberations associated with dealing with this acceptance category for the first time in the categorization phase might have led to slower reaction-times and lower confidences (for both groups of subjects) in sequence 1, than in sequence 2.

Self-Reports

Table 5-23 shows the nature of responses for both groups in terms of the coding scheme described earlier. Here, too, as in the previous studies, the EBG reported significantly more nonanalytic strategies (45%) compared to the RBG (0%) confirming

Table 5-22

Study 3: Categorization Latency and Confidence Means by Sequence and Test Instance

	Categorization Latency		Categorization Confidence	
	Test Instance 1	Test Instance 2	Test Instance 1	Test Instance 2
Sequence 1	7.24	5.38	5.41	5.65
Sequence 2	5.78	6.68	5.95	5.72

Table 5-23

Study 3: Self-Reports on Categorization Strategies

	Test Instance 1					Test Instance 2					Analytic Reports[a]	Nonanalytic Reports[b]
	1	2	3	4	5	1	2	3	4	5		
EBG	13	25	8	54	0[c]	5	35	4	56	0	55[d]	45
RBG	95	5	0	0	0	93	7	0	0	0	100	0

1, 2, 3, 4, 5 -- codes for self-reports

1 -- analytic, based on learned rule

2 -- analytic, based on induced rule

3 -- analytic comparison between test instance and learning exemplar/s

4 -- nonanalytic comparison between test instance and learning exemplar/s

5 -- no response

a -- percentage of analytic reports (combining categories 1, 2, 3) considering both test instances

b -- percentage of nonanalytic reports (category 4 considering both test instances

c -- percentage out of 80 responses

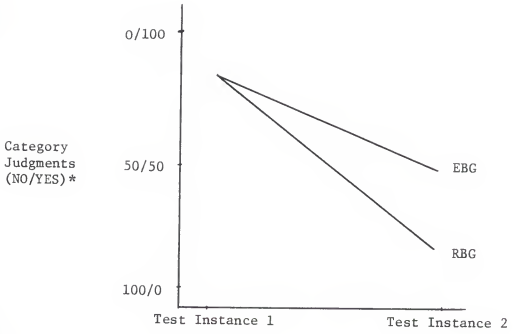
d -- percentage out of 160 responses

our prediction. In fact, the percentage of nonanalytic reports by the EBG exceeded those observed in studies 1 and 2 (26% and 34%, respectively).

Category Judgments

As reported earlier (Pretest 3), both test instances in this study were viewed as similar in an overall sense to the learning exemplars. Accordingly, the EBG was expected to judge both instances as fitting the acceptance category. Test instance 1 (the B&B brand) was judged as consistent and test instance 2 (the Tanqueray brand) as inconsistent with the rule defining the acceptance category by pretest subjects. Thus, the RBG was expected to accept the former and reject the latter in terms of category membership. The group x test instance interaction thus was the focus of the analysis. The latter was found to be statistically significant (P = .0002). Figure 5-3 shows the pattern of judgment outcomes.

As predicted, the RBG judged test instance 1 as fitting the acceptance category (percentage of acceptance judgments = 81%), and test instance 2 as not (acceptance judgments = 20%). The EBG judged both as fitting the category (78% and 55% acceptance judgments respectively). The only departure from the predictions was the rather low level of acceptance of test instance 2 on the



---

* NO/YES -- proportion of nonacceptance/acceptance judgment in terms of the learning set.

Figure 5-3

Study 3: Pattern of Category Judgment Outcomes

part of the EBG. No explanations were apparent for such a finding.

Contingent Factor: Category Knowledge

Hypothesis H4 was confirmed in this study, based on the following evidence. First, the single "inconsistent-true" feature (presumably) reflected consistent patterns of verification accuracy and latency differences between the EBG and the RBG. Second, performance on the other processing indices were confirmatory of the processing differences underlying rule-analytic and exemplar-nonanalytic models. Third, category-judgment predictions set forth on the basis of the above two models were confirmed. The disconfirmatory findings, particularly those associated with "irrelevant" verification features were similar to those observed in the previous studies.

Contingent Factor: Form of Exemplar Presentation

Our assessment of H4 led us to conclude that processing differences between the EBG and the RBG had been real and possibly influenced by the form of presentation of exemplars and test instances (i.e., pictorial).

Additional Data

Findings with respect to the additional data were consistent with those observed in the previous studies. EBG respondents that described themselves as nonanalytic reported fewer analytic and more nonanalytic strategies than those describing themselves as analytic (Table 5-24). RBG respondents did not demonstrate such a relationship between preferred processing styles and reported categorization mechanisms. Prior familiarity with alcoholic beverages and the respondent's sex were found to be unrelated to differences on any of the processing indices.

The above concludes the presentation of analyses and results for study 3. In the next section, study 4 will be presented.

Study 4: Residential Houses

Study 4 was considered to be similar to study 3, in terms of the form of presentation of exemplars and test instances (i.e., pictorial), and the nature of to-be-verified features (i.e., irrelevant-true/false). Also, subjects were believed to possess concrete exemplars and rules for residential homes prior to the study at levels comparable to that for alcoholic beverages in study 3. Thus, there was some intuitive basis for

Table 5-24

Study 3: Relationship Between Preferred Processing Styles and Self-Reports Among the EBG

Preferred Style	Analytic Strategies[a]	Nonanalytic Strategies[b]
Analytic	79	21
Somewhat Analytic, Somewhat Nonanalytic	67	33
Nonanalytic	60	40

a -- percentage of analytic self-reports, out of total number of reports on both test instances (obtained by combining self-report codes 1, 2, 3, Table 5-8)

b -- percentage of nonanalytic self-reports, out of total number of reports on both test instances (code 4, Table 5-8)

anticipating that such category information might be invoked by the subjects during categorization, i.e., usage of rules and/or exemplars encountered prior to the study.

Overview

Table 5-25 presents a summary of findings on each of the hypotheses and their associated predictions.

As in study 3, the EBG was expected to be more accurate, faster and more confident in verifying the category "irrelevant" features associated with each of the learning exemplars. The difference between the groups on each of the above measures were insignificant ($P = .77$ for accuracy, $P = .99$ for latency, and $P = 0.3$ for confidence). Thus, predictions based on exemplar memorability differences between the EBG and the RBG were unconfirmed in study 4. The mediating influence of overall similarity (H1A) was also undetected and a similar pattern of means (i.e., between each learning exemplar and the test set) as in the previous studies was observed.

The most immediate explanation for the above was apparent in examining subjects' self-reports (H3). Here, the general pattern of results was similar to the previous studies, i.e., the EBG reported more nonanalytic reports than the RBG. A specific feature-based rule was found to dominate the former's analytic reports. In total, 77.5% of the total EBG self reports (out of

Table 5-25

Summary of Results from Study 4

Verification Paradigm (H1,H1A)						Category Judgment Predictions		Contingent Dimensions	
P1	P2	P3	H1A	P4	P5	P6		H4	H5
Predictions unconfirmed				Predictions confirmed directionally, approaching statistical significance			Predictions unconfirmed	Predictions unconfirmed	

H1-H5 -- hypotheses investigated in the study (see Chapter Three)
P1-P6 -- predictions
P1 -- EBG will be more accurate than the RBG in verifying the irrelevant features of past exemplars
P2 -- EBG will be faster than the RBG in verifying the irrelevant features of past exemplars
P3 -- EBG will be more confident than the RBG in verifying the irrelevant features of past exemplars
P4 -- RBG will be faster than the EBG in categorizing the test instances
P5 -- RBG will be more confident than the EBG in categorizing the test instances
P6 -- EBG will report more nonanalytic strategies than the RBG

160, i.e., eighty for each of the two test instances) were characterized as reflecting use of a self-generated rule (i.e., code 2, Table 5-8). Out of 124 such analytic reports based on self-generated rules, 75 (or 60%) consisted of the following: Mr. Dickson prefers two-storied houses. It thus appears that EBG subjects somehow induced the above rule as describing the acceptance category. Retrieval of such an autonomous feature, perceived as defining the acceptance category, might have characterized their categorization processes rather than retrieval of exemplars and comparisons of overall similarity as expected. Thus, the verification indices did not reflect fundamental processing differences. The above is somewhat surprising since two of the learning exemplars from the acceptance category were two-storied houses but one was single-storied. Why such an objectively inaccurate rule was induced by so many of the EBG respondents remains inexplicable.

The findings on the categorization latency and confidence measures, though confirmatory, might be explained in light of the above. The RBG was found to be faster (though the group difference failed to achieve significance, $P = .3$) and more confident ($P = .006$) than the EBG on these measures. These might reflect differences in rule learning conditions between the two groups rather than real processing differences. Since the EBG induced a rule, as opposed to learning one through formal

instructions (as with the RBG), they might have deliberated more during the categorizations and felt less confident in their judgments than the RBG.

The category judgments themselves were similar between both the groups, disconfirming our predictions. Both the EBG and the RBG judged the two instances as being somewhat ambiguous in terms of their membership to the acceptance category. Satisfactory explanations for the above were not available.

The lack of findings on the key verification indices, as well as the nature of rule reporting by the EBG (as discussed above), led us to reject both H4 and H5. That is, it was believed that neither the difference in the type of category knowledge between the groups, nor the pictorial presentation of exemplars and test instances was successful in inducing fundamentally different categorization mechanisms in this study.

With respect to the additional data, the EBG demonstrated a pattern of relationship between preferred processing styles and reported strategies similar to that in the previous studies. Significantly fewer nonanalytic strategies were reported by individuals describing themselves as being nonanalytic than in the above. Familiarity with residential homes and the respondents' sex were found to be unrelated to differences in the processing indices.

The following sections present the analysis and findings on each hypothesis and prediction, in more detail.

Verification Accuracy

As in study 3, it was predicted that the EBG would be more accurate than the RBG for the entire set of verification features, but the predicted group main effect was insignificant ($P = .77$). Planned comparisons revealed that for only one of these verification features (the true feature associated with learning exemplar 1, i.e., the red colored house), was the EBG significantly more accurate than the RBG ($P = .05$). Such differential performance for a specific verification feature was not predicted, and appeared to be inexplicable in terms of any difference in absolute memorabilities associated with such features (Pretest 5, Table 4-37). A rationale for the above might be advanced if one accepts that significant numbers of EBG respondents adopted a single feature analytic rule as evidenced in the self-reports. The verification question on which group difference in accuracy was significant read as follows: "The red house has curtains in the windows." In reality, the slide for this house showed a two-storied house with curtained windows in the second floor. It may be that the EBG respondents, having decided that the defining rule for the category was related to the number of stories, paid special attention as to whether or not each of the learning-stage houses was two-storied and, consequently, possessed greater memory vis-a-vis the design and features associated with the upper floor.

In summary, then, the verification accuracy measure did not reflect the processing differences, predicted by H1, between the two groups.

Verification Latency

It was expected that the EBG would be faster than the RBG in verifying the features associated with the learning exemplars, again, the relevant group main effect was insignificant ($P = .99$). Planned comparisons revealed that the EBG and the RBG were virtually equivalent in terms of latencies associated with each of the six verification features.

Verification Confidence

Since only "irrelevant" features were included in the verification set, the EBG was expected to express greater confidence in such judgments than the RBG, but the relevant group main effect was again insignificant ($P = .3$). While the RBG expressed a slightly higher mean confidence than the EBG, planned comparisons revealed that group differences were insignificant for each of the six features.

Mediating Role of Overall Similarity

Similar to findings in the previous studies, group performances on the verification indices did not vary as a function of the level of overall similarity between each learning exemplar and the set of test instances. That is, the group x similarity interactions were insignificant for each of the verification features and for all the three verification indices (i.e., accuracy, latency and confidence). The range of overall similarity means was comparable between all the studies (i.e., extreme values were unavailable) which implies that conditions appropriate to test H1A were unavailable in this study as well.

Categorization Latency and Confidence

The RBG was somewhat faster than the EBG in categorizing the test instances, but the group difference approached but failed to attain significance ($P = .3$). A sequence x test instance interaction, though unexpected, was found to be significant ($P = .0004$). Table 5-26 shows the means for the above interaction. Test instance 1 (the beige colored house) was the first categorization item from the house category encountered by both groups of subjects in sequence 1, while it was the second categorization item from the category in sequence 2. The novelty of the categorization task vis-a-vis this particular category

Table 5-26

Study 4: Categorization Latency Means by Sequence and Test Instance

	Test Instance 1	Test Instance 2
Sequence 1	8.11	6.54
Sequence 2	6.77	7.55

seems to have led to significantly higher (P = .04) reaction times for the test instance 1 in sequence 1 over that in sequence 2.

The RBG expressed significantly greater confidence (mean = 5.38) than the EBG (mean = 4.86) in categorizing the set of test instances (P = .006). In summary, then, findings on the above two measures were viewed as confirming the predictions based on H2.

Self-Reports

Table 5-27 shows the pattern of group responses that were obtained for each category of the coding scheme described earlier. As in the previous studies, the EBG reported more nonanalytic strategies (23.5%) than the RBG (5.5%). Hypothesis H3 was hence supported. Examination of the self-generated categorization rules (particularly by the EBG), i.e., responses in code 2, provoked some interesting insights. Table 5-28 shows the nature of rules that were commonly reported by the EBG respondents. Sixty percent of the self-generated rules involved a particular feature--whether or not the to-be-categorized house was two-storied. It seemed EBG subjects had determined the above as defining or characteristic of the three learning-phase exemplars (i.e., houses). This was somewhat surprising, because

Table 5-27

Study 4: Self-Reports on Categorization Strategies

	Test Instance 1					Test Instance 2					Analytic Reports[a]	Nonanalytic Reports[b]
	1	2	3	4	5	1	2	3	4	5		
EBG	3	61	11	21	4[c]	8	63	3	26	0	74.5[d]	23.5
RBG	84	10	1	5	0	86	6	2	6	0	94.0	5.5

1, 2, 3, 4, 5 -- codes for self-reports

1 -- analytic, based on learned rule

2 -- analytic, based on induced rule

3 -- analytic comparison between test instance and learning exemplar/s

4 -- nonanalytic comparison between test instance and learning exemplar/s

5 -- no response

a -- percentage of analytic reports (combining categories 1, 2, 3) considering both test instances

b -- percentage of nonanalytic reports (category 4) considering both test instances

c -- percentage out of 80 responses

d -- percentage out of 160 responses

Table 5-28

Use of Self-Generated Category Defining Rules by the EBG

Rule[a]	Percentage of Responses in Code 2[b]
1. Mr. Dickson prefers two-storied houses	60
2. Mr. Dickson prefers houses made of wood	17
3. Mr. Dickson prefers traditional style houses	8
4. Mr. Dickson prefers brightly coloured houses	5

a -- only those rules that were mentioned five times or over, have been included in the list.

b -- percentages shown are based on a total of 124 responses that were obtained in code 2 of the scheme (including both test instances).

one of these, the pink and white colored house was in fact single-storied. Specific articulation of such a rule by a significant proportion of EBG subjects seemed to indicate that the categorization mechanisms by the latter might indeed have been analytic in nature. The above, then, appears to be consistent with the lack of group differences on the key verification-based indices. That is, subjects from both groups appeared to have adopted analytic processing, albeit using different rules. Such would then account for the differences between the EBG and the RBG on the categorization latency and confidence measures.

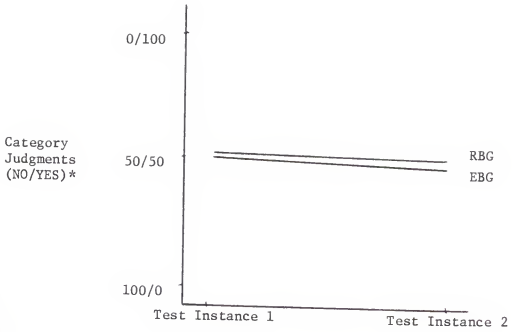
Category Judgment

According to the predetermined properties of the test instances, the RBG was expected to perceive test instance 1 (i.e., the beige colored house) as being inconsistent, and test instance 2 (i.e., the brown colored house) as being consistent with the rules (Table 4-34). The former, then, was predicted to be rejected and the latter accepted as a member of the acceptance category. The EBG was expected to accept the first and reject the second test instance, since the former was established through pretests to be similar, and the latter dissimilar to the three learning exemplars (pretest 3, Table 4-35). In other

words, a group x test instance interaction was predicted. The latter, however, was insignificant (P = .74). Both groups judged the two instances similarly and as being somewhat ambiguous in terms of their membership in the acceptance category (Figure 5-4). No explanation for the above was apparent through examination of the pattern of judgments likely on adoption of alternative categorization models (i.e., those discovered in pretest 4, Figure 4-9). Also, the EBG judgments were not consistent with the single-feature categorization rule that was found to dominate their self-reports. Both the test instances were two-storied houses, and should have been accepted as being members of the acceptance category on application of such a rule. Nevertheless, the EBG judged both of these as being ambiguous. In summary, observed category judgments disconfirmed our predictions.

Contingent Factor: Category Knowledge

Using an inference procedure similar to the previous studies, it was concluded that the configuration of results on the processing results disconfirmed hypothesis H4. This was so, because the key verification features failed to demonstrate processing difference between the groups, as predicted. Further, the category-judgment predictions failed to materialize, and a



---

* NO/YES -- proportion of nonacceptance/acceptance judgments in terms of the learning set.

Figure 5-4

Study 4: Pattern of Category Judgment Outcomes

particular feature-based rule was found to dominate EBG's description of categorization mechanisms. Even though the categorization latency and confidence predictions were confirmed, these might be reconciled with the above using an alternative explanation, similar to study 2. That is, it might be argued that both groups adopted analytic categorization strategies, albeit using different rules. While the RBG learned the rule for the acceptance category through instructions in the study, the EBG induced one through exposure to the learning exemplars. Such a difference in rule-learning conditions led to the observed differences on categorization latency and confidence. The EBG was somehow less confident in using the rule that they themselves had developed, and hence, spent more time in categorizing. If so, these differences do not reflect real processing differences between the two groups, as further evidenced by their performance on exemplar memorability indices.

Contingent Factor: Form of Exemplar Presentation

Our previous discussion also led us to disconfirm H5 in this study. That is, it was concluded that the configuration of results indicated that the pictorial form of presentation of exemplars and test instances did not lead to exemplar-nonanalytic processing on the part of the EBG. Rather, both groups adopted

analytic processing mechanisms. Of all four studies reported so far, this was the only one where H5 was believed to have been disconfirmed. Satisfactory explanations for why such might have occurred remain unavailable. It is conceivable that the stimuli in this study were too difficult to categorieze in an overall sense.

Additional Data

EBG respondents that described themselves as nonanalytic, reported fewer analytic and more nonanalytic strategies than those who described themselves as analytic (Table 5-29). In the RBG, no such relationship was apparent. These results were similar to those observed in the previous studies. However, in study 4 significantly more analytic strategies were reported by EBG respondents that characterized themselves as being nonanalytic (i.e., 88%, compared to 65% in study 1, 70% in study 2, and 60% in study 3). Such a difference could have been possible if a number of EBG subjects discovered and used an analytic rule during the categorization.

As in the previous studies, prior familiarity with residential homes and respondents' sex were found to be unrelated to any significant differences on processing indices.

The above concludes our discussion of study 4. In the next section, a summary of the findings across the four studies will

Table 5-29

Study 4: Relationship Between Preferred Processing Styles and Self-Reports among the EBG

Preferred Style	Analytic Strategies[a]	Nonanalytic Strategies[b]
Analytic	94.1	5.9
Somewhat analytic, somewhat non-analytic	90.0	10.0
Nonanalytic	88.0	12.0

a -- percentage of analytic self-reports, out of total number of reports on both test instances (obtained by combining self-report codes 1, 2, 3, Table 5-8)

b -- percentage of nonanalytic self-reports, out of total number of reports on both test instances (code 4, Table 5-8)

be presented, considering each hypothesis, its associated predictions and conclusions, individually.

Summary

In this section, a summary of findings on each hypothesis across all the four studies will be presented. Besides commenting on whether or not specific predictions were confirmed, tentative explanations will be offerred (if available) for disconfirmatory findings. We begin by discussing the hypotheses pertaining to exemplar memorability (i.e., H1, H1A), which constituted the focus of this investigation, followed by the set of other processing indices (H2, H3, as well as category judgments), the contingent factors (H4, H5), and, finally, the observations on the additional data collected during the studies.

Exemplar Memorability: H1, H1A

Verification accuracy

The EBG was predicted to be more accurate than the RBG in verifying consistent-false, and inconsistent-true features associated with exemplars from the four acceptance categories. The above was confirmed in study 1 (with some support in study 3), and disconfirmed in study 2 (study 4 did not include the

above types of verification features). The lack of confirmation in study 2 was explained in terms of its unique form of presentation of learning exemplars and test instances (i.e., words, as opposed to pictures in studies 1, 3, and 4). The latter was believed to have led to an analytic orientation in categorizing the test instances on the part of the EBG. Thus, differences with the RBG, in terms of relative strengths of memory traces for past instances were not observed.

The EBG was also expected to be more accurate than the RBG in verifying the "irrelevant" features associated with past exemplars. Such a prediction was disconfirmed in each of the four studies. An explanation for this involved a re-examination of the "irrelevant" features used in the studies. It was speculated that characteristics other than category relevance/irrelevance associated with particular verification features (e.g., degree of interconnectedness with other features, etc.) might have influenced the relative strengths with which such features occurred in their respective exemplar representations. These characteristics (which were not examined in the studies) could have led to weaker representations for the "irrelevant" features, preventing adequate retrieval during categorizations. This, then, could have attenuated memory enhancement as predicted, leading to equivalent verification accuracies on the part of both the EBG and the RBG. The above,

though plausible, remains a speculation that demands more explicit treatment in future research.

In summary, then, confirmation of predictions on consistent-false and inconsistent-true features in study 1 and probably in study 3, where such were expected, led us to conclude that the verification-based measures were successful in reflecting differences in categorization mechanisms. As discussed above, the appropriate operationalization of "irrelevant" features remains a candidate for future investigations.

Verification latency

The EBG was expected to be faster than the RBG in verifying the consistent-false and inconsistent-true features. In study 1 (and to some extent in study 3) such an effect was indeed observed, although the latter fell short of statistical significance. In study 2, the unique presentation format led us to predict that such latency differences would not emerge. This was also observed in the study. The major issue that is relevant in this context concerns the relative weakness in the observed relationships. Two potential explanations were offered. First, the memory load on the EBG due to the fairly large number of exemplars to which they were exposed, might have led them to be

slower. Second, the consistency/inconsistency relationship associated with certain verification features might have been sufficiently extreme to provoke the EBG to adopt a category-based heuristic in verifying them, rather than undertake memory scanning. That is, if a particular feature was viewed as quite consistent/inconsistent with the acceptance category, the EBG might have used such a basis in determining the presence/absence of the feature. The latter could have led to comparable accuracies between the two groups. Verification features were characterized as "consistent" or "inconsistent," based on the experimentor's judgment. Future investigations could adopt such characterizations based on subjects' perceptions (i.e., through pretests) to avoid extreme relationships.

The EBG was also expected to be faster than the RBG in verifying the "irrelevant" features. Such a prediction was disconfirmed in each of the four studies. Explanation for the above follow along similar lines as for the verification accuracy measures described earlier.

In summary, with the exception of "irrelevant" features, generally confirmatory findings (albeit with varying levels of statistical significance) were obtained for the verification latency measures in studies 1, 3 and 4 and some operational refinements were suggested to better reflect processing differences on these.

Verification confidence

The RBG was expected to be more confident than the EBG in verifying category relevant features (i.e., consistent/inconsistent) associated with past exemplars. The results disconfirmed such a prediction in each of the studies. It was speculated that the complexity of the task (i.e., retrieving the appropriate rule from a set of four and applying the consistency/inconsistency-based heuristic) might have prevented the RBG from feeling more confident in verifying the features. Future research could adopt simpler procedures (i.e., involving one or two rules, fewer categories, and exemplars) to ascertain whether or not confidence differences are manifested.

The EBG was expected to be more confident than the RBG in verifying the "irrelevant" features. Results from each of the studies disconfirmed such a prediction. No specific explanation for the above was available other than that regarding potential problems with "irrelevant" features utilized in the study as described in the context of accuracy and latency measures.

Mediating influence of overall similarity

It was predicted that differences in exemplar memorability between the EBG and the RBG would only be observed for those exemplars that were viewed as moderately similar (in an overall

sense) to the respective set of test instances by the EBG. Results indicated, however, that each of the learning exemplars from all the four studies were viewed moderately similar by the EBG. Since extremely similar/dissimilar exemplars were not available (i.e., as perceived by EBG subjects), conditions for appropriate testing of this hypothesis were believed to be absent in this investigation.

In summary, even though the findings with respect to the exemplar-memorability hypotheses (H1 and H1A) were somewhat mixed, observed relationships were viewed as generally supportive of the underlying logic of the verification-based paradigm. This was believed to be so primarily because of consistent findings across the studies on "consistent-false" and "inconsistent-true" features. Further refinements of the paradigm along the suggested directions might lead to enhancement in the diagnostic values of the various measures, allowing sharper identification between the rule-analytic and exemplar-nonanalytic categorization models.

Other Processing Indices: H2, H3, Category Judgments

Categorization latency and confidence

The RBG was expected to be both faster and more confident than the EBG in categorizing the test instances. These predictions were confirmed across the four studies.

As pointed out earlier, the above needs to be viewed in relation to the key verification measures in drawing inferences about different categorization mechanisms. When the two are complementary (as in studies 1 and 3) there exists a stronger basis for concluding that the two groups had in fact adopted fundamentally different mechanisms. In the event inconsistencies emerge (as in studies 2 and 4), an alternative explanation might be evoked to reconcile the two. For example, if the EBG respondents induce specific category-defining rules during the course of a study and use them analytically during categorization, then observed differences in categorization latency and confidence might not reflect differences in processing (as compared to the RBG) but merely differences in rule-learning. That is, the RBG could be faster and more confident in categorization than the EBG since the former learned a rule through formal communication, while the latter induced one during exposure to exemplars.

Self-reports

The EBG was expected to report more nonanalytic strategies than the RBG, following the categorizations. The latter was confirmed in each of the four studies. Further, this measure was found to be particularly useful in providing insights regarding

potential rule induction on the part of the EBG. In study 4, the latter might have used a particular self-generated rule which surfaced where describing their processing strategies. The above combined with findings on verification and categorization-based indices, allowed us to draw significant inferences regarding the nature of processing among the EBG. The measure, therefore, seems to possess significant diagnostic value and is worthy of inclusion in future research with this paradigm.

Category judgments

No specific hypothesis was advanced regarding differences in category judgments between the EBG and the RBG. Rather, stimuli were chosen and pretested to reflect differences between rule-analytic and exemplar-nonanalytic judgment procedures.

With the exception of study 3, category judgment predictions for the EBG and the RBG were disconfirmed in the experiment. Further, explanations for the same, based on alternative models (i.e., those different from a rule-analytic or an exemplar-nonanalytic one, which were identified through pretest 4 in each study) were not forthcoming. It remains unclear as to why subjects in the four studies did not demonstrate judgment patterns similar to the respective pretests.

Contingent Factors: H4, H5

Type of category knowledge

Two of the four studies (1 and 3) confirmed the predictions based on H4. That is, the configuration of results on key verification-based and other processing indices led us to conclude that the difference in category knowledge between the EBG and the RBG had indeed led to the adoption of fundamentally different categorization strategies. The EBG was exposed to exemplars only (from the acceptance categories) while the RBG in addition was given the rules that defined these categories. Accordingly exemplar-nonanalytic processing was expected from the EBG, and the RBG was expected to adopt rule-analytic strategies. As described earlier, the above appears to have been confirmed in study 1 with similar indications in study 3.

In study 2, no evidence for processing differences was observed on the verification-based measures. This could have been so due to the influence of another contingent factor, i.e., the form of presentation of exemplars and test instances. Similarly, processing differences were undetected in study 4. The latter involved a pictorial presentation form similar to studies 1 and 3. It is hence surprising why similar differences did not emerge here. One possibility is that if subjects generally conceived of residential houses in terms of a specific rule (i.e., two-storied or single-storied) that was identified in

EBG's self-reports, then the latter could have applied the same in the study regardless of the nature of the actual learning exemplars. In other words, the nature of extant category information (regarding houses in general) might have superceded that communicated during the learning phase. Already possessing a rule, the RBG might not have evolved and used a different rule. The EBG might have utilized the above rule as being the most appropriate. Since no efforts were made to elicit such category information prior to the study, the above remains speculative. The findings on study 4 also draw attention to the contingent nature of categorization processes described earlier. While the judgment contexts in the studies were believed to be relatively neutral (i.e., not encouraging specific strategies), other contingencies (e.g., nature of prior knowledge) could have led to significant departures from the anticipated mechanisms.

Form of exemplar presentation

Three of the four studies (1, 2, 3) provided some support for the picture-word distinction in categorization mechanisms (H5). That is, it was believed that the pictorial presentation form led the EBG to adopt exemplar-nonanalytic processing (as evidenced through differences with the RBG, on the range of processing indices) in study 1 (and probably in study 3). In study 2 the presentation form (i.e., words) encouraged the latter

to adopt an analytic orientation similar to the RBG. Differences on the key processing measures were hence unobserved in this study. The only exception, in terms of this hypothesis was observed in study 4. Here, the pictorial presentation form was predicted to lead to processing differences between the groups similar to that observed in studies 1 and 3. Explanations for the lack of findings appear to lie in considerations similar to those discussed in the context of H4, i.e., the possibility that subjects utilized their extant category knowledge regarding residential houses (features, rules, etc.) during the categorizations.

Additional Data

Preferred processing styles

The most significant finding with respect to the above was that EBG respondents describing themselves as being nonanalytic, reported fewer analytic and more nonanalytic strategies than those describing themselves as being analytic. The above relationship was not observed for the RBG subjects. The latter seems to indicate that when category-judgment contexts are relatively free of task demands or other processing cues (as with the EBG), individuals' preferred processing styles largely influence the nature of the adopted mechanism (as evidenced

through the self-reports). When such cues are present, as with task instructions given to the RBG, preferred styles are abandoned in favor of mechanisms perceived as more appropriate. The above provides an interesting insight regarding the influence of individual characteristics on processing strategies. Further, it sheds some light on the relative importance of preference versus capabilities with respect to information processing. The lack of findings between preferred styles and other processing measures used in the study, however, remains unexplained. Even though the items of the adopted scale seemed to possess face validity, detailed investigation of its psychometric properties was not attempted in this investigation. In light of the insights gleaned from the results reported above, a full-fledged inquiry into the nature of influence of preferred styles on categorization appears to be an attractive candidate for future research.

Product class familiarity

Across each of the four studies, no significant differences were detected on the processing indices based on different levels of prior product class familiarity. Reasons for the above could include the following. First, the strategy of utilizing specific acceptance categories could have prevented subjects from drawing

on general product class knowledge and instead rely on that acquired during the studies. That is, in describing each of the target categories, in terms of exemplars and/or rules related to specific individuals, subjects seemed to have focussed on the perceived nature of these only. Thus, external knowledge, as a function of prior familiarity with the product class in general, might not have influenced their categorization decisions. Second, moderate levels of familiarity with each product class were reported by both groups of respondents. This was not entirely consistent with our intuitive expectations (see basis for choice of product classes, in Chapter Four). That is, vacation tours did not receive lower familiarity ratings than the other three as expected, and with limited variance on familiarity scores, potential influences were undetected.

Sex of the respondent

Across all four studies, differences on processing indices were found to be unrelated to the sex of the respondents.

The above concludes our discussion of the results from this experiment. The next chapter will present the major conclusions, as well as indicate directions for future research.

CHAPTER SIX

CONCLUSION

The purpose of this chapter is to present insights gleaned from the four studies and to suggest directions for future research. In view of the summary of results presented in the concluding section of Chapter Five, the following sequence of discussion will be adopted. First, an overall appraisal of the verification-based paradigm will be undertaken and comparisons drawn with the category-judgment paradigm. Next, specific comments, insights, and suggestions for future research will be offered with respect to four general areas. These are, aspects associated with measuring verification performance, those associated with the "other" processing indices, processing contingencies, and finally, with respect to the nature of stimuli and procedures utilized in the experiment. In the last section, implications of the findings in terms of categorization theories will be discussed, and future research directions suggested.

The success or failure of a methodological framework needs to be ascertained based on the goals of the investigation. As discussed earlier (Chapter Two), the verification-based paradigm was believed to be flexible in accomodating various research objectives. These could include a) documenting different

categorization mechanisms through consideration of the exemplar memorability characteristics of each; and b) determining conditions under which specific categorization mechanisms are likely to be adopted by consumers. The objective of this investigation was focussed on distinguishing between two categorization models--the rule-based analytic and the exemplar-based nonanalytic. Accordingly, the thrust was towards creating experimental conditions that would be adequate in terms of providing respondents with opportunity for engaging in either of these two mechanisms. Such conditions could also be appropriate in investigating theoretical relationships between processing models and various category-learning and judgment contingencies. The choice of experimental conditions and procedures was thus designed to be consistent with the above goals. Our results across the four studies (as summarized in Chapter Five) suggested that the verification-based paradigm was indeed capable of capturing the distinctions between the contending models in terms of the processing assumptions embodied by each. In particular, the verification accuracy and latency measures were found to be generally effective in two of the four studies where such processing differences were believed to have been operative. While certain of our predictions failed to materialize, post-hoc explanations seemed to point at procedural rather than conceptual shortcomings. The first attempt at employing this paradigm to

identify divergent categorization models was thus viewed as encouraging, providing incentive for further refinements in future research.

The category-judgment paradigm in comparison was far less successful in our investigation. Only in Study 3 were predicted judgment patterns observed. Even though the verification-based and other indices indicated in study 1 that the two groups had adopted different processes, similar category judgments (of the two test instances) were made by both the groups. The latter might be viewed as evidence that the verification paradigm is capable of affording more valid and finer distinction between categorization models than that offered by the category-judgment paradigm. Counterarguments to such a claim of superiority could include the view that stimulus conditions in the studies were not appropriate for assessment of the category-judgment paradigm. That is, since real brands were used as stimuli, rather than artificial materials, tight control of stimulus properties was not guaranteed. Such "real" stimuli, (which varied on a number of dimensions besides the rule-based properties), could have provoked categorization mechanisms different from those anticipated. Adoption of such unanticipated processes, then, could have led to the observed judgment outcomes. Our objection to the above argument is based on the following. First, appropriate pretests were undertaken to ensure that subjects

would perceive each of the learning and to-be-categorized instances as possessing the desired rule and overall-similarity properties. Second, alternative processing mechanisms that could be adopted by respondents were also investigated in pretests. These were based on similarities between the exemplars on perceptually salient attributes (other than those involved in the respective category-defining rules communicated to the RBG), i.e., those that might be viewed by subjects as defining the category of exemplars. Observed judgments (in Studies 1, 2, 4), however, did not confirm the predictions based on such alternative processing rules. Finally, it was believed that adoption of artificial stimuli for purposes of working with the category-judgment paradigm would seriously limit the domain of research questions that might be raised by consumer researchers. Most importantly, identifying the nature of mechanisms likely to be adopted by consumers within particular categories of brands could be jeopardized. The verification paradigm does not impose such constraints vis-a-vis the nature of stimuli. In the following sections, specific comments, insights, and suggestions regarding different aspects of the above paradigm will be presented.

Aspects Associated with Verification Performance

The Role of "Irrelevant" Features

The most significant disconfirmation of our predictions involved "irrelevant" features associated with exemplars from each of the four acceptance categories. Both the EBG and the RBG were found to be equally accurate, fast, and confident in verifying these features. The basis for expecting differences in performance on these was the following: Since an exemplar representation in memory consists of all the features actually associated with the exemplar, its retrieval during categorization should lead to retrieval and memory enhancement for all such features. This would be so regardless of whether or not a particular feature was associated with a rule that defined the exemplar as being a member of a category. Exemplar-based processing by the EBG, hence should lead to enhanced memory for even category-irrelevant features. The RBG would suffer a detriment in performance with respect to irrelevant features, since knowing the appropriate category rule would not provide them with a basis for assessing their presence or absence.

While the above was considered a valid conceptual basis for predicting differences in processing, other considerations seemed to be equally warranted to allow proper manifestations of these. For example, it was speculated that other properties of exemplar features (i.e., besides rule relevance/irrelevance) could lead to

differences with respect to the strength with which these are associated in an exemplar representation. It could be that, regardless of rule relevance/irrelevance, the extent of centrality of a feature or its degree of interconnectedness to other aspects determines how readily it would be brought to mind when an exemplar is retrieved during categorization. While supporting evidence is unavailable at this point, "irrelevant" features utilized in this experiment could have been truly background with respect to the experience of each exemplar (even if they were perceptually salient enought to be recalled above chance in pretests) or insufficiently integrated with other features. These, then, could have prevented adequate rehearsal during exemplar-based comparisons leading to lack of memory enhancement. Conceptually speaking, rule-relevance/irrelevance, degree of integration, level of centrality, etc., are independent properties, and future research needs to treat them with more care. That is, only when both category relevant as well as irrelevant features have been designed (i.e., through pretests) in terms of appropriate levels of these additional properties, predictions on "irrelevant" features might indeed materialize.

Another explanation for the lack of findings on irrelevant features might be based on the nature of the pretest directed towards determining the appropriate levels of salience for the

verification aspects. In pretest 5 (for all the studies) subjects were asked to verify features from the three learning phase exemplars. However the main study contained verification features from twelve learning exemplars from four different acceptance categories. Thus, there might have been enhanced interference in the experiment, leading to detriment in performance on the relatively insignificant, or irrelevant features. That is to say that our pretests might have overstated the salience levels for these features, and appropriate procedures need to ensure that the pretest for salience measurement mirror the study conditions more clearly.

Verification Confidence

In each of the four studies, predictions with respect to verification confidence were unrealized. The failure to observe higher confidences on the part of the RBG for category relevant features (i.e., consistent/inconsistent) was ascribed to the possibility that significant memory load was experienced by these respondents. The EBG too was believed to have failed in demonstrating higher confidence than the RBG on category irrelevant features, due to enhanced demands on memory. The significant demand on the RBG's memory could have been due to the fair number of rules (i.e., four) that they were required to choose from, to assess consistency/inconsistency of each

verification aspect. The EBG needed to retrieve one out of twenty exemplars from memory and scan it to verify each and every feature. Even though subjects' perceptions of memory load were not solicited, it appeared that some reduction in the number of categories (i.e., rules, exemplars and number of verification features) could lead to some manifestation of group differences based on their respective memorability for past exemplars. The above is suggested for more focussed investigations of verification confidence as an index for processing differences.

Characterization of Verification Features

Features in the verification set were characterized as being "consistent," "inconsistent," or "irrelevant," in terms of their relationship to the defining rule for each of the respective categories. These characterizations were arrived at through the judgment of the experimentor. An emerging realization from this study was that such characterizations are fundamentally idiosyncratic, reflecting how individuals "put together" various aspects of a certain domain in their own conceptual shemata. Idiosyncracies in prior experiences and training might lead one individual to believe that a specific aspect possesses consistency relationships with the overall meaning of a category (i.e., such an aspect has some probability

of occurring in several of its members), while to some other, e relationship might be one of inconsistency/irrelevance. To the extent such beliefs might be systematic in a given population of respondents, collecting information with respect to the latter (i.e., in pretests) could remove some unnecessary ambiguities. Thus, if subjects (in pretests) are asked to judge whether, and to what extent, a feature is consistent/inconsistent/irrelevant to a given category, such information could be used to further refine the verification set, as follows: a) features that are ambiguous with respect to the above characterizations, could be removed or replaced; and b) features that are viewed as extremely consistent or inconsistent could be removed. The latter might provoke even the EBG to adopt a category-based heuristic for responding to the verification set, rather than attempting to scan memory. This might prevent exemplar memorability differences from being reflected on the verification indices.

In addition to the above refinements, future research also needs to create appropriate conditions for testing the mediating influence of overall similarity on verification measures (H1A). Explanation for the lack of findings here was fairly straightforward: EBG subjects perceived (i.e., rated) each exemplar of an acceptance category to be somewhat similar to the respective set of test instances. Since extremely similar/dissimilar exemplars were unavailable, the predicted relationship could not be adequately tested.

Aspects Associated with "Other" Indices

Even though category judgments, per se, are unimportant as processing indices within the verification paradigm, these judgments are necessary within the experimental procedures. Collecting the latencies, confidences and self-reports associated with category judgments of unfamiliar instances might therefore be fairly costfree. Further, they might prove to be of diagnostic value in conjunction with the verification measures, as was observed in this experiment.

Examining category judgments made by respondents could prove to be useful where the research goal is to determine how consumers view a given brand (particularly a new one) in terms of several different product categories. Here, judgment outcomes might be as important as judgment processes. Determining the category assignment that consumers are likely to make vis-a-vis a novel brand would set up bases for consumers' expectations, evaluations and inferences. Category-judgment outcomes, while somewhat dubious in terms of their ability to discriminate between mechanisms, have considerable value in providing information necessary for product positioning decisions.

Aspects Associated with Processing Contingencies

Both the processing contingencies focussed on in this study (i.e., type of category knowledge, and the form of presentation

of exemplars and test instances) provided valuable insight into the aspects of real conditions that are likely to encourage specific mechanisms. This, however, constituted the secondary focus of the study. In order to understand the nature of categorization processes under specific environments, more focussed and programatic research is necessary, involving the range of factors described in our mixed model. A complete list of such factors is likely to be fairly long and the following alternatives might be suggested to deal with such effectively: a) creating typologies of consumer, stimuli, category learning, and judgment contexts; and b) specific categorization environments likely to be encountered by consumers (i.e., supermarket shopping, "natural" television viewing, etc.) might be described in terms of specific levels of contextual factors likely to be important.

A final comment pertains to our finding regarding individual differences in processing styles and its impact on adopted strategies. Even though a single processing index (i.e., self-reports) reflected a systematic relationship, future investigations might be successful in providing deeper insights using more sophisticated instruments and procedures.

Aspects Associated with Stimuli and Procedures

Our choice of the specific product categories (i.e., stores, vacations, beverages and homes) was guided by our intuitive assessment of the nature of subjects' prior memory regarding these. As was observed in Study 4, these might have played a significant role in influencing the categorization mechanisms (i.e., use of a single-feature analytic rule). The success of the verification paradigm (in documenting different processing mechanisms) is contingent on the premise that subjects rely on category knowledge acquired within the experimental procedures. Specific differences in exemplar memorability might be predicted based on such information, and identification of processes confirmed or disconfirmed depending upon the observed performances. The latter might be further sharpened by conducting pre-experimental sessions directed at learning particular rules and/or specific exemplars that are salient in subjects' memory in relation to specific product classes. For example, product classes that strongly evoke a particular rule or a specific exemplar/s might be avoided, since these might override other manipulations in the experiment. The latter should not be of concern if the research goal is to determine the nature of processing under specific characteristics of consumers' memory.

The second issue concerns our use of "acceptance categories" during the learning phase of the experiment. Briefly, the motivation for such was as follows: our understanding of the mixed model indicated that exposing individuals to exemplars from contrasting categories contiguously leads to conditions for discrimination learning. The latter encourages rule induction and might foster an analytic orientation in subsequent processing. Such unintended rule formations might lead all respondents to adopt similar (analytic) strategies, obliterating any real potential for differences. Accordingly, in our studies exemplars and rules were communicated without reference to alternative categories. Rather, these were identified as describing the categories of acceptable brands for specific individuals. Thus, by directing attention towards individual exemplars and rules, it was hoped that subjects could be prevented from assuming particular processing orientations prematurely. Our results indicated that such a category acquisition condition was successful in avoiding discrimination learning on the part of our subjects. Based on the above, the use of acceptance categories to introduce specific exemplars and/or rules is recommended in future research that is directed at documenting differences in processing. If, however, the goal is to understand the nature of processing under discrimination learning conditions (which might characterize some real consumer environments), the above would be inappropriate.

Subjects in our experiment were provided with standard "speed-accuracy" instructions prior to the verification task. That is, they were asked to respond as quickly as possible without sacrificing accuracy. Such verification instructions are quite critical and might have significant impact with respect to predictions on different verification measures. It is conceivable that verification instructions might encourage one of two response strategies and effects. First, if subjects are instructed to be as accurate as possible without concern for time, then there could be enhanced motivation to scan memory to ascertain presence/absence of a feature. If verification features are somewhat memorable or perceptually salient in themselves (i.e., meeting some base-line on pre-experimental recall), this could lead to equivalent accuracies between rule-analytic and exemplar-nonanalytic processors. The latter, due to exemplar memorability advantages, might be faster in verification than the former. That is, both respondents might be equivalent on accuracy, but different on latency, if instructions encourage memory scanning by emphasizing on accuracy. Second, if subjects are instructed to respond as quickly as possible, without significant regard for accuracy, then the simpler category-feature consistency/inconsistency heuristic might be adopted as the dominant response strategy, particularly by the rule-analytic processors. This would be so because the latter have weaker

memory for past exemplars following categorization than for exemplar-nonanalytic processors. While responding on the basis of the simple heuristic might lead to systematic biases in accuracy, potentially confirming the verification accuracy predictions, such judgments might be made with comparable speed (i.e., to memory scanning), obliterating any latency difference between rule-analytic and exemplar-nonanalytic processors.

Realizing both verification accuracy and latency predictions, then, requires that subjects perceive the instructions as truly balanced in terms of speed and accuracy requirements. This could call for added pretesting. Alternatively, the instructions themselves could be varied between conditions (as described above), i.e., one condition focusing on accuracy, and the other on latency as the critical processing index.

Even though no reactance was observed on the part of subjects with respect to the extent of the experimental task (i.e., total time or level of concentration necessary), some reduction in terms of memory load might be warranted in future research. This could be achieved by having fewer studies incorporated in the procedures, thereby reducing the number of exemplars, rules, and verification judgments. The latter might help to increase the level of confidence that subjects experience regarding the verification judgments, potentially leading to

confirmation of the predictions associated with confidence. Fewer exemplars might also help to sharpen the differences on verification accuracy and latency measures.

Finally, it is appropriate to assess the overall contribution of this research, and suggest future directions. Our interest in categorization was born out of the notion that such a process constitutes a fundamental information processing activity that has substantial ramifications for consumers' interactions with particular products/brands. It was believed that the mental categorization of a brand allows consumers to recognize it as belonging in some previously-experienced assortment, which in turn might ascribe to it specific evaluations and inferences regarding attributes, qualities and capabilities for providing satisfaction. Understanding the mental processes involved in such categorizations was thus viewed as critical. Given such a perspective, and the knowledge of alternative categorization processes described in past research, the objective was to develop a methodology to identify these with reliability and validity. The contribution of this research lies in making a successful first step towards realizing such an objective. Further refinements along the lines suggested in this chapter should lead towards a robust framework within which a number of processing-related issues may be dealt with successfully.

While, intuitively, different categorization mechanisms might be postulated to affect brand recognition, evaluation and

inferences differently, strong research evidence remains unavailable about this. It would be interesting, for example, to investigate, if exemplar-based nonanalytic processing leads to greater variance in brand evaluation than rule-based analytic processing as a function of which past exemplar/s serves as the referrent for comparison and category assignment. Exemplar-nonanalytic comparisons might lead to different inferences regarding unobserved attributes of an unfamiliar brand than rule-analytic processing, as a function of properties of retrieved exemplars. Exemplar-nonanalytic processing might also lead to a greater probability for misclassification for a brand relative to rule-analytic processing.

Besides the more conceptually driven research questions described above, understanding differences in categorization processes might also serve a critical purpose in the design and marketing of new products/brands. To the extent that marketers are interested in developing a specific positioning of their brands within given product markets (so as to foster differences in preference with respect to competitors) it would be useful to know a priori the nature of the comparison processes that form the basis for such distinctions. Here, the decisions regarding what sorts of cues to provide to target segments (i.e., through product design, packaging, advertising and other communications) could benefit from ascertaining how such information would be

utilized by consumers. If, for example, consumers in a given product class typically evaluate brands in a particular setting (e.g., new grocery items during routine supermarket visits), relying on specific categorization mechanisms, then the above cues could be tailored to facilitate information processing to achieve intended brand perceptions and evaluations.

Examining categorization processes, then, is likely to provide a more sophisticated understanding of both theoretical as well as applied issues in the fields of consumer behavior and marketing.

APPENDIX A
QUESTIONNAIRE FOR PRETESTS

PRETEST 1 AND 3 (RULE SIMILARITY)

Welcome to the Study!

In a few minutes we shall show you some slides on the wall in front of you. Please view them carefully. Afterwards, you will be asked to answer some questions from memory.

Before we begin, let us tell you a few things about the categories of products/services that you will view today, and which are of special interest to us.

One of these is "travel".

Living in Florida, we are obviously aware of the significant impact of the tourism industry on the economy and lifestyles around us. Vacationing in foreign countries has also seen a rapid increase over the past few years. Talking to new as well as seasoned travellers, travel companies usually find that people tend to think about vacation tours as belonging to either of two classes. Some vacation trips may be thought of as primarily relaxation oriented. That is, they are in the best spirit of enjoyment in which a person simply relaxes and has fun. Others may be thought of differently. They mainly expose a person to historical/ architectural/cultural/environmental features of some area of the world and provide an enriching experience. We shall call the first type of trip - "relaxation oriented" and the other, "personal enrichment oriented". Some trips are almost entirely one or the other. Some trips are combinations of both. It appears that people consider the activities, events, etc. associated with a specific trip to determine whether it has more of one type of features (e.g., "Learning" oriented) or the other, before they make a choice.

The second product category that we shall look at is "Alcoholic Beverages".

Over the years, alcohol has come to symbolize gracious living, and the industry boasts a wide variety of products to suit a

variety of tastes. Traditionally, these beverages have been described in terms of whether they are consumed before dinner, with dinner, or after dinner. While whiskey, gin, vodka as well as different cocktails are usually consumed before dinner, wines are most common during the meal, and brandy, cognac and several different types of liqueurs are favored after dinner. Both foreign as well as domestic companies today, serve such distinctive market segments.

The third product category that we shall look at is "Department Stores". Besides being a significant contributor to our annual GNP, the retail industry today also reflects a broad range of choices in terms of different types of stores to match a variety of consumers' tastes. Market research reveals that people tend to view stores as being either "Exclusive" or "Mass oriented". Department stores that are viewed as "exclusive" usually carry merchandize that are only of "high" to "very high" quality, and where the display environment is both extremely classy and distinctive.

"Mass-stores" on the other hand usually carry merchandize that range over several quality levels and where the shopping environment is functionally efficient. While some stores are entirely one type or the other, some are combinations of both.

The second product category that we shall look at is "Residential Houses". The variety of architectural styles of homes across this country reflects distinct geographic/climatic, as well as ethnic/cultural diversity. While many different styles are currently popular, one which seems to have a significant amount of preference from homebuilders, is the modern version of the traditional North-Eastern home. Such houses usually have at least one of the following two features:

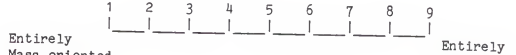
* they are two storied;

* they show less artistic detail work around windows, doors, or porches and have large surfaces of walls uninterrupted by columns of designs

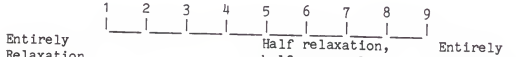
While some houses are clear representatives of the above variety, some are clearly different, still some others have certain degrees of similarity with the modern version of the traditional North-Eastern home.

Subject Number _____

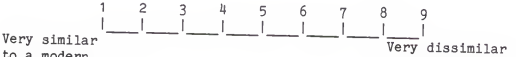
1. The store showing COSMETICS is:



2. The WILDLIFE OF INDIA trip is:


1 2 3 4 5 6 7 8 9
Entirely Relaxation Oriented
Half relaxation, half personal enrichment oriented
Entirely personal enrichment oriented

3. The PINK AND WHITE house is:



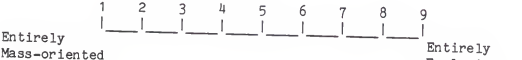
4. The B and B brand is:

_____ an after dinner drink

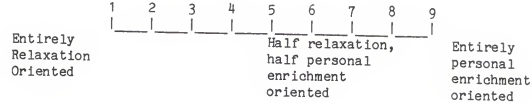
_____ a during dinner drink

_____ a before dinner drink

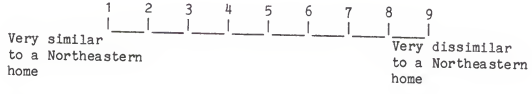
5. The store showing JEWELRY is:



6. The IBERIAN SUNSEEKER trip is:


1 2 3 4 5 6 7 8 9
Entirely Relaxation Oriented
Half relaxation, half personal enrichment oriented
Entirely personal enrichment oriented

7. The RED house is:



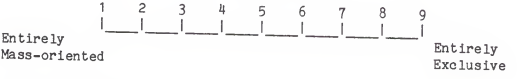
8. The COINTREAU brand is:

an after dinner drink

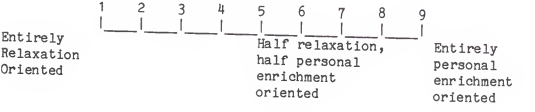
a during dinner drink

a before dinner drink

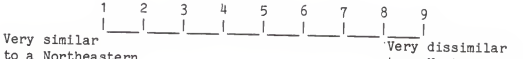
9. The store showing WOMENS' DRESSES is:



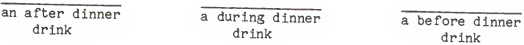
10. The ALPS-CENTRAL EUROPE trip is:


1 2 3 4 5 6 7 8 9
Entirely Relaxation Oriented
Half relaxation, half personal enrichment oriented
Entirely personal enrichment oriented

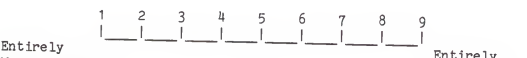
11. The BROWN house is:



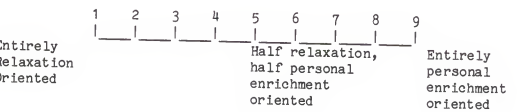
12. The HIRAM WALKER brand is:



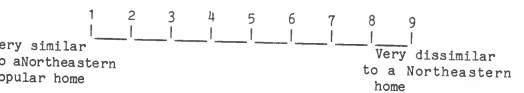
13. The store showing WOMENS' SHOES is:



14. The MEXICO trip is:


1 2 3 4 5 6 7 8 9
Entirely Relaxation Oriented
Half relaxation, half personal enrichment oriented
Entirely personal enrichment oriented

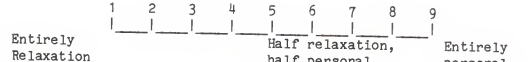
15. The BLUE AND WHITE home is:



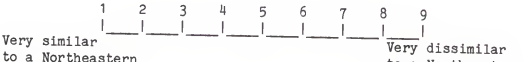
16. The TANQUERAY brand is:

an after dinner drink	a during dinner drink	a before dinner drink

17. The MEXICO trip is:


1 2 3 4 5 6 7 8 9
Entirely Relaxation Oriented
Half relaxation, half personal enrichment oriented
Entirely personal enrichment oriented

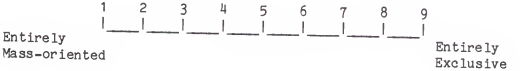
18. The BLUE AND WHITE home is:



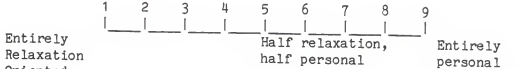
19. The TANQUERAY brand is:

an after dinner drink	a during dinner drink	a before dinner drink

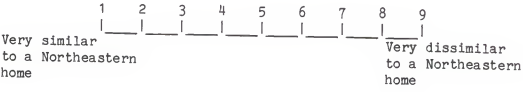
20. The store showing ANTIQUES is:



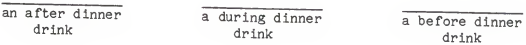
21. The EGYPT AND THE MIDDLE EAST trip is:


1 2 3 4 5 6 7 8 9
Entirely Relaxation Oriented
Half relaxation, half personal enrichment oriented
Entirely personal enrichment oriented

22. The BEIGE house is:



23. The BAILEYS brand is:



PRETEST 2 and 3 (EXEMPLAR OVERALL SIMILARITY)

Welcome to the Study!

In a few minutes we shall show you some advertising copy material. Please read them carefully. Afterwards you will be asked to answer some questions from memory.

Subject Number _____

1. Think back about the store slide that you viewed just now.

Leaving aside specific aspects of each store, but considering the "overall picture" that each of the slides creates in your mind, how similar do you think is:

The store showing COSMETICS to the following stores showing (circle appropriate numbers):

	Highly Similar	Somewhat Similar	Not at all Similar
JEWELRY	3	2	1
WOMENS SHOES	3	2	1
WOMENS DRESSES	3	2	1
ANTIQUES	3	2	1

The store showing WOMENS DRESSES to the following stores showing (circle appropriate numbers):

	Highly Similar	Somewhat Similar	Not at all Similar
JEWELRY	3	2	1
WOMENS SHOES	3	2	1
ANTIQUES	3	2	1

The store showing JEWELRY to the following stores showing (circle appropriate numbers):

	Highly Similar	Somewhat Similar	Not at all Similar
WOMENS SHOES	3	2	1
ANTIQUES	3	2	1

The store showing WOMENS SHOES to the following stores showing (circle appropriate numbers):

	Highly Similar	Somewhat Similar	Not at all Similar
ANTIQUES	3	2	1

2. Think back about the tour descriptions that you viewed just now. Leaving aside the day-to-day details of each trip (e.g., specific activities, events, etc.), but considering the "overall picture" that each description creates in your mind, how similar do you think is:

The MEXICO trip to the following (circle appropriate numbers):

	Highly Similar	Somewhat Similar	Not at all Similar
IBERIAN SUNSEEKER	3	2	1
ALPS-CENTRAL EUROPE	3	2	1
WILDLIFE OF INDIA	3	2	1
EGYPT AND THE MIDDLE EAST	3	2	1

The IBERIAN SUNSEEKER trip to the following (circle appropriate numbers):

	Highly Similar	Somewhat Similar	Not at all Similar
ALPS-CENTRAL EUROPE	3	2	1
WILDLIFE OF INDIA	3	2	1
EGYPT AND THE MIDDLE EAST	3	2	1

The ALPS-CENTRAL EUROPE trip to the following (circle appropriate numbers):

	Highly Similar	Somewhat Similar	Not at all Similar
WILDLIFE OF INDIA	3	2	1
EGYPT AND THE MIDDLE EAST	3	2	1

The WILDLIFE OF INDIA trop to the following (circle appropriate numbers):

	Highly Similar	Somewhat Similar	Not at all Similar
EGYPT AND THE MIDDLE EAST	3	2	1

3. In terms of "overall impressions" of each of the beverage ads, how similar do you think is the B & B brand to the following: (circle appropriate number):

	Highly Similar	Somewhat Similar	Not at all Similar
BAILEYS	3	2	1
HIRAM WALKER	3	2	1
TANQUERAY	3	2	1
COINTREAU	3	2	1

The TANQUERAY brand to the following (circle appropriate number):

	Highly Similar	Somewhat Similar	Not at all Similar
BAILEYS	3	2	1
HIRAM WALKER	3	2	1
COINTREAU	3	2	1

The BAILEYS brand to the following (circle appropriate number):

	Highly Similar	Somewhat Similar	Not at all Similar
HIRAM WALKER	3	2	1
COINTREAU	3	2	1

The HIRAM WALKER brand to the following (circle appropriate number):

	Highly Similar	Somewhat Similar	Not at all Similar
COINTREAU	3	2	1

4. In terms of the "overall pictures" of each of the house slides, how similar do you think is the RED COLORED house to the following (circle appropriate number):

	Highly Similar	Somewhat Similar	Not at all Similar
the PINK AND WHITE house	3	2	1
the BLUE & WHITE house	3	2	1
the BROWN house	3	2	1
the BEIGE house	3	2	1

The PINK AND WHITE COLORED house to the following (circle the appropriate number):

	Highly Similar	Somewhat Similar	Not at all Similar
the BLUE & WHITE house	3	2	1
the BROWN house	3	2	1
the BEIGE house	3	2	1

The BLUE & WHITE COLORED house to the following (circle the appropriate number):

	Highly Similar	Somewhat Similar	Not at all Similar
the BROWN house	3	2	1
the BEIGE house	3	2	1

The BROWN COLORED house to the following (circle the appropriate number):

	Highly Similar	Somewhat Similar	Not at all Similar
the BEIGE house	3	2	1

PRETEST 4

1. The merchandise displayed in the store showing WOMENS SHOES is:

1 2 3 4 5 6 7 8 9

extremely inexpensive ——— extremely expensive

2. The decor of the store showing WOMENS SHOES is:

1 2 3 4 5 6 7 8 9

not at all modern ——— extremely modern

3. The environment of the store showing WOMENS SHOES is:

1 2 3 4 5 6 7 8 9

extremely informal ——— extremely formal

4. The displays in the store showing WOMENS SHOES are:

1 2 3 4 5 6 7 8 9

highly cluttered ——— few and elegant

5. The store showing WOMENS SHOES is:

1 2 3 4 5 6 7 8 9

very small ——— very spacious

6. The area of the store showing WOMENS SHOES has:

1 2 3 4 5 6 7 8 9

subtle lighting ——— very bright lighting

1. The merchandise displayed in the store showing ANTIQUES is:

	1	2	3	4	5	6	7	8	9	
extremely inexpensive										extremely expensive

2. The decor of the store showing ANTIQUES is:

	1	2	3	4	5	6	7	8	9	
not at all modern										extremely modern

3. The environment of the store showing ANTIQUES is:

	1	2	3	4	5	6	7	8	9	
extremely informal										extremely formal

4. The displays in the store showing ANTIQUES are:

	1	2	3	4	5	6	7	8	9	
highly cluttered										few and elegant

5. The store showing ANTIQUES is:

	1	2	3	4	5	6	7	8	9	
very small										very spacious

6. The area of the store showing ANTIQUES has:

	1	2	3	4	5	6	7	8	9	
subtle lighting										very bright lighting

1. The merchandise displayed in the store showing COSMETICS is:

	1	2	3	4	5	6	7	8	9	
extremely inexpensive										extremely expensive

2. The decor of the store showing COSMETICS is:

	1	2	3	4	5	6	7	8	9	
not at all modern										extremely modern

3. The environment of the store showing COSMETICS is:

	1	2	3	4	5	6	7	8	9	
extremely informal										extremely formal

4. The displays in the store showing COSMETICS are:

	1	2	3	4	5	6	7	8	9	
highly cluttered										few and elegant

5. The store showing COSMETICS is:

	1	2	3	4	5	6	7	8	9	
very small										very spacious

6. The area of the store showing COSMETICS has:

	1	2	3	4	5	6	7	8	9	
subtle lighting										very bright lighting

1. The merchandise displayed in the store showing WOMENS DRESSES is:

	1	2	3	4	5	6	7	8	9	
extremely inexpensive										extremely expensive

2. The decor of the store showing WOMENS DRESSES is:

	1	2	3	4	5	6	7	8	9	
not at all modern										extremely modern

3. The environment of the store showing WOMENS SHOES is:

	1	2	3	4	5	6	7	8	9	
extremely informal										extremely formal

4. The displays in the store showing WOMENS DRESSES are:

	1	2	3	4	5	6	7	8	9	
highly cluttered										few and elegant

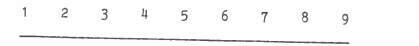
5. The store showing WOMENS DRESSES is:

	1	2	3	4	5	6	7	8	9	
very small										very spacious

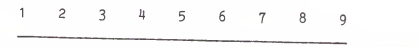
6. The area of the store showing WOMENS DRESSES has:

	1	2	3	4	5	6	7	8	9	
subtle lighting										very bright lighting

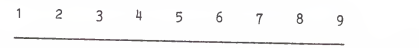
1. The merchandise displayed in the store showing JEWELRY is:



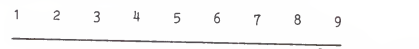
2. The decor of the store showing JEWELRY is:



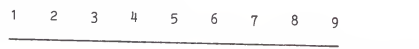
3. The environment of the store showing JEWELRY is:



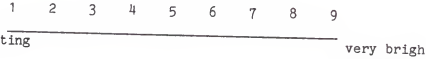
4. The displays in the store showing JEWELRY are:



5. The store showing JEWELRY is:



6. The area of the store showing JEWELRY has:



1. The WILDLIFE OF INDIA trip features:

More of local cuisine	More of Western cuisine

2. The WILDLIFE OF INDIA trip features:

Warm tropical climate	Mild temperatures

1. The EGYPT AND THE MIDDLE EAST trip features:

More of local cuisine	More of Western cuisine

2. The EGYPT AND THE MIDDLE EAST trip features:

Warm tropical climate	Mild temperatures

1. The ALPS-CENTRAL EUROPE trip features:

More of local cuisine	More of Western cuisine

2. The ALPS-CENTRAL EUROPE trip features:

Warm tropical climate	Mild temperatures

1. The MEXICO trip features:

More of local cuisine	More of Western cuisine

2. The MEXICO trip features:

Warm tropical climate	Mild temperatures

1. The IBERIAN SUNSEEKER trip features:

More of local cuisine	More of Western cuisine

2. The IBERIAN SUNSEEKER trip features:

Warm tropical climate	Mild temperatures

1. The COINTREAU ad showed a drink that was:

light colored dark colored creamy colored of different

2. The COINTREAU brand was a:

Brandy Liquer Gin

3. The COINTREAU brand was:

1 2 3 4 5 6 7
inexpensive expensive

4. The COINTREAU brand is a product of:

Ireland Italy France England USA

1. The BAILEYS ad showed a drink that was:

light colored	dark colored	creamy colored	of different colors

2. The BAILEYS brand was a:

Brandy	Liquer	Gin

3. The BAILEYS brand was:

1	2	3	4	5	6	7
inexpensive						expensive

4. The BAILEYS brand is a product of:

Ireland	Italy	France	England	USA

1. The B & B ad showed a drink that was:

light colored	dark colored	creamy colored	of different colors

2. The B & B brand was a:

Brandy	Liquer	Gin

3. The B & B brand was:

1	2	3	4	5	6	7
inexpensive						expensive

4. The B & B brand is a product of:

Ireland	Italy	France	England	USA

1. The BLUE & WHITE COLORED house:

had a lot of trees in its environment	had some trees in its environment	had very few trees in its environment

2. The BLUE & WHITE COLORED house is:

	1	2	3	4	5	6	7	8	9	
very inexpensive										very expensive

3. The BLUE & WHITE COLORED house is:

	1	2	3	4	5	6	7	8	9	
not at all modern in style										very much modern in style

4. The BLUE & WHITE COLORED house is:

2 storied	1 storied

1. The BROWN COLORED house:

had a lot of trees in its environment	had some trees in its environment	had very few trees in its environment

2. The BROWN COLORED house is:

	1	2	3	4	5	6	7	8	9	
very inexpensive										very expensive

3. The BROWN COLORED house is:

	1	2	3	4	5	6	7	8	9	
not at all modern in style										very much modern in style

4. The BROWN COLORED house is:

2 storied	1 storied

1. The PINK & WHITE COLORED house:

had a lot of trees in its environment	had some trees in its environment	had very few trees in its environment

2. The PINK & WHITE COLORED house is:

	1	2	3	4	5	6	7	8	9	
very inexpensive										very expensive

3. The PINK & WHITE COLORED house is:

	1	2	3	4	5	6	7	8	9	
not at all modern in style										very much modern in style

4. The PINK & WHITE COLORED house is:

2 storied	1 storied

1. The RED COLORED house:

had a lot of trees in its environment | had some trees in its environment | had very few trees in its environment

2. The RED COLORED house is:

1 2 3 4 5 6 7 8 9

very inexpensive — very expensive

3. The RED COLORED house is:

1 2 3 4 5 6 7 8 9

not at all modern in style — very much modern in style

4. The RED COLORED house is:

2 storied | 1 storied

1. The BEIGE COLORED house:

had a lot of trees in its environment	had some trees in its environment	had very few trees in its environment

2. The BEIGE COLORED house is:

	1	2	3	4	5	6	7	8	9	
very inexpensive										very expensive

3. The BEIGE COLORED house is:

	1	2	3	4	5	6	7	8	9	
not at all modern in style										very much modern in style

4. The BEIGE COLORED house is:

2 storied	1 storied

APPENDIX B
LIST OF VERIFICATION FEATURES

Study 1

Type of Feature	Exemplar	Verification Question
Consistent-True	1	The store showing WOMENS DRESSES has a chandelier.
Consistent-False	1	The store showing WOMENS DRESSES has a brass footstool next to the recliner.
Inconsistent-True	1	The store showing WOMENS DRESSES has merchandize with little variety in design or colour
Inconsistent-False	1	The store showing WOMENS DRESSES has an "EXIT" sign painted on the walls.
Irrelevant-True	1	The store showing WOMENS DRESSES has a circular dress rack behind the recliner.
Irrelevant-False	1	The store showing WOMENS DRESSES has a painting on one of the walls.
Consistent-True	2	The store showing JEWELRY has some jewelry displayed in glass covered and carpet-lined boxes.
Consistent-False	2	The store showing JEWELRY has a chandelier.
Inconsistent-True	2	The store showing JEWELRY has an ordinary looking telephone on a table.
Inconsistent-False	2	The store showing JEWELRY has different styled earrings on a revolving display

Irrelevant-True	2	The store showing JEWELRY has one of the set of drawers opened.
Irrelevant-False	2	The store showing JEWELRY has a brown colored telephone on one of the tables.
Consistent-True	3	The store showing WOMENS SHOES has dark wooden furniture.
Consistent - False	3	The store showing WOMENS SHOES has a fine miniature painting on one of its walls.
Inconsistent-True	3	The store showing WOMENS SHOES has a shoe rack extending so high that it may be difficult to reach some pairs at the top.
Inconsistent-False	3	The store showing WOMENS SHOES has a few shoe boxes stacked on the floor.
Irrelevant-True	3	The store showing WOMENS SHOES has light fixtures on its pink colored ceiling.
Irrelevant-False	3	The store showing WOMENS SHOES has a number of chairs with light colored cushions.

Study 2

Type of Feature	Exemplar	Verification Question
Consistent-True	1	The WILDLIFE OF INDIA trip provides an opportunity to watch the Asian lion.
Consistent-False	1	The WILDLIFE OF INDIA trip features a visit to a tribal hunting festival.
Inconsistent-True	1	The WILDLIFE OF INDIA trip offers special continental and American cuisine.
Inconsistent-False	1	The WILDLIFE OF INDIA trip offers accomodation in luxury hotels.
Irrelevant-True	1	The WILDLIFE OF INDIA trip features a trip to the foot of the Northern Himalayas.
Irrelevant-False	1	The WILDLIFE OF INDIA trip features double occupancy at all inns at the reserve locations.
Consistent-True	2	The EGYPT AND THE MIDDLE EAST trip offers an experience with life in oasis towns.
Consistent-False	2	The EGYPT AND THE MIDDLE EAST features a visit to the famous Aswan dam on the Nile.
Inconsistent-True	2	The EGYPT AND THE MIDDLE EAST trip features a belly dance performance.
Inconsistent-False	2	The EGYPT AND THE MIDDLE EAST trip features health spas at first class hotels.
Irrelevant-True	2	The EGYPT AND THE MIDELE EAST trip features a visit to the bazzars of Alexandria.
Irrelevant-False	2	The EGYPT AND THE MIDDLE EAST trip features flight connections through London.
Consistent-True	3	The ALPS-CENTRAL EUROPE trip features a trip on the canals of Amsterdam.

Consistent - False	3	The ALPS-CENTRAL EUROPE trip features a visit to the watch manufacturing guilds of Switzerland.
Inconsistent- True	3	The ALPS-CENTRAL EUROPE trip features local music and dance performances.
Inconsistent- False	3	The ALPS-CENTRAL EUROPE trip features visits to German nightclubs.
Irrelevant- True	3	The ALPS-CENTRAL EUROPE trip offers an opportunity to travel to Eastern Europe.
Irrelevant- False	3	The ALPS-CENTRAL EUROPE trip features optional assistance of interpreters.

Study 3

Type of Feature	Exemplar	Verification Question
Irrelevant-True	1	The BAILEYS ad showed three candles reflecting off a glass panel at the rear.
Irrelevant-False	1	The BAILEYS ad showed a bunch of white flowers next to the gold colored box.
Irrelevant-True	2	The COINTREAU ad showed a drink that was light colored.
Irrelevant-False	2	The COINTREAU ad showed the bottle sitting on the shelf of a wooden cabinet.
Irrelevant-True	3	The HIRAM WALKER ad showed three glasses with ice in each one of them.
Irrelevant-False	3	The HIRAM WALKER ad showed an ice bucket next to the bottle and the glass.

Study 4

Type of Feature	Exemplar	Verification Question
Irrelevant-True	1	The RED house has curtains in the windows.
Irrelevant-False	1	The RED house has a wood colored garage door.
Irrelevant-True	2	The BLUE AND WHITE house has a few dark colored bands on the white chimney.
Irrelevant-False	2	The BLUE AND WHITE house has a bicycle laying on the front yard.
Irrelevant-True	3	The PINK AND WHITE HOUSE has a brick fence running round it.
Irrelevant-False	3	The PINK AND WHITE house showed a bicycle laying in front of the home.

APPENDIX C
PROCESSING STYLE QUESTIONNAIRE

Please place a check on the most self-descriptive answer for each of the following questions. Note that in making these judgments, you should COMPARE YOURSELF WITH MOST PEOPLE YOU KNOW.

A. Are you able to visualize (i.e., picture things in your mind?

much more than most people	somewhat more than most people	about the same	somewhat less than most people	much less than most people

B. In making decisions, do you tend to be more deliberate as opposed to being spontaneous?

much more than most people	somewhat more than most people	about the same	somewhat less than most people	much less than most people

C. Do you consider yourself to be intuitive?

much more than most people	somewhat more than most people	about the same	somewhat less than most people	much less than most people

D. Do you prefer to mentally break things apart to understand them, rather than concentrating on how they function in their entirety?

much more than most people	somewhat more than most people	about the same	somewhat less than most people	much less than most people

E. Do you consider yourself to be a practical person rather than being imaginative or fanciful?

much more than most people	somewhat more than most people	about the same	somewhat less than most people	much less than most people

F. Do you tend to discover relationships (similarities/differences) between different instances encountered at different times and in different places?

much more than most people	somewhat more than most people	about the same	somewhat less than most people	much less than most people

G. Do you like to think about abstract concepts and ideas rather than concrete instances?

much more than most people	somewhat more than most people	about the same	somewhat less than most people	much less than most people

H. In making decisions, do you feel more comfortable with standards rather than feelings?

much more than most people	somewhat more than most people	about the same	somewhat less than most people	much less than most people

I. Faced with a problem to solve, do you tend to break it down into its components rather than trying to deal with it more globally?

much more than most people	somewhat more than most people	about the same	somewhat less than most people	much less than most people

J. In making decisions and judgments, does your head rule your heart on most occasions?

much more than most people	somewhat more than most people	about the same	somewhat less than most people	much less than most people

K. In making new judgments, are you likely to trust your prior experience with similar instances (i.e., draw analogies)?

much more than most people	somewhat more than most people	about the same	somewhat less than most people	much less than most people

L. Do you see yourself as a cool-headed and logical person rather than someone who is willing to rely on "hunches"?

much more than most people	somewhat more than most people	about the same	somewhat less than most people	much less than most people

APPENDIX D
FAMILIARITY QUESTIONNAIRE

Before participating in this study, how familiar were you with each of the four product categories listed below? (circle a number for each)

	Very Familiar	Reasonably Familiar	Not at all Familiar
A. Foreign travel (vacation tours)	3	2	1
B. Department stores	3	2	1
C. House architecture	3	2	1
D. Alcoholic beverages	3	2	1

REFERENCES

Abelson, R.P. (1976), "Script-Processing in Attitude Formation and Decision Making," in Cognition and Social Behavior, ed. J.S. Carroll and J.W. Payne, Hillsdale, N.J.: Erlbaum.

Alba, J.W., and Hasher, L. (1983), "Is Memory Schematic?," Psychological Bulletin, 93, 203-231.

Alba, J.W., and Hutchinson, J.W. (1985), "A Framework for Understanding Consumer Knowledge: II. Comparison and Inference Process," working paper, Center for Consumer Research, University of Florida, Gainesville, FL 32611.

Alba, J.W., and Hutchinson, J.W. (1987), "Dimensions of Consumer Expertise," Journal of Consumer Research, 13, 411-454.

Allen, R.B., and Ebbesen, E.B. (1981), "Cognitive Processes in Person Perception: Retrieval of Personality Trait and Behavioral Information", Journal of Experimental Social Psychology, 17, 119-141.

Allport, G.W. (1937), Personality: A Psychological Interpretation, New York: Rinehart & Winston.

Altom, M.W., and Lingle, J.H. (1980), "Episodic and Categorical Processes in Impression Change", ed. L. Ross, Problems in Reconceptualization: Integrating New Facts With Old Concepts, Symposium presented at the meeting of the American Psychological Association, Montreal, 1980.

Anderson, N.H. (1974), "Information Integration Theory: A Brief Survey," in Contemporary Developments in Mathematical Psychology, Vol. 2, eds. D.H. Krantz, R.C. Atkinson, R.D. Luce, and P. Suppes, New York: Academic Press, 236-305.

Anderson, N.H. (1981a), Foundations of Information Integration Theory, New York: Academic Press.

Anderson, N.H. (1981b), "Integration Theory Applied to Cognitive Responses and Attitudes," in Cognitive Responses in Persuasion, eds. R.E. Petty, T.M. Ostrom, and T.C. Brock, Hillsdale, NJ: Lawrence Erlbaum Associates, 361-397.

Anderson, N.H. (1982), Methods of Information Integration Theory, New York: Academic Press.

Anglin, J.M. (1977), Word, Object, and Consequential Development, New York: Norton.

Atkinson, J.W. (1957), "Motivational Determinants of Risk-Taking Behavior," Psychological Review, 64, 359-372.

Bargh, J.A. (1984), "Automatic and Conscious Processing of Social Information," in Handbook of Social Cognition, Vol. 3, eds. R.S. Wyer, Jr. and T.K. Srull, Hillsdale, NJ: Erlbaum, 1-43.

Barsalou, L.W. (1982), "Context-Independent and Context-Dependent Information in Concepts," Memory and Cognition, 10, 82-93

Barsalou, L.W. (1983), "Ad Hoc Categories," Memory & Cognition, 11, 211-227.

Bettman, J.R. (1979), An Information Processing Theory of Consumer Choice, Reading, MA: Addison Wesley.

Bettman, J.R., Capon, N., and Lutz, R.J. (1975a), "Cognitive Algebra in Multi-Attribute Attitude Models," Journal of Marketing Research, 13, 151-164.

Bettman, J.R., Capon, N. and Lutz, R.J. (1975b), "Multiattribute Measurement Models and Multiattribute Attitude Theory: A Test of Construct Validity," Journal of Consumer Research, 1, 1-15.

Boring, E.G. (1950), A History of Experimental Psychology, New York: Appleton-Century-Crofts.

Bower, G.H. (1981), "Mood and Memory," American Psychologist, 36, 129-148.

Bower, G.H., Black, J.B., and Turner, T.J. (1979), "Scripts in Memory for Text," Cognitive Psychology, 11, 177-220.

Brooks, L (1978), "Nonanalytic Concept Formation and Memory for Instances," in Cognition and Categorization, eds. E. Rosch and B.B. Lloyd, Hillsdale, NJ: Erlbaum, 169-211.

Bruner, J.S. (1957), "On Perceptual Readiness," Psychological Review, 64, 123-152.

Bruner, J.S., Goodnow, J.J. and Austin, G.A. (1956), A Study of Thinking, New York: Wiley.

Busemeyer, J.R., Dewey, G.I., and Medin, D.L. (1984), "Evaluation of Exemplar-Based Generalization and the Abstraction of Categorical Information," Journal of Experimental Psychology: Learning, Memory and Cognition, 4, 638-648.

Cantor, N. (1982), "A Cognitive-Social Approach to Personality," in Personality, Cognition and Social Interactions, eds. N. Cantor and J.F. Kihlstrom, Hillsdale, NJ: Erlbaum, 23-44.

Cantor, N., and Mischel, W. (1977), "Traits as Prototypes: Effects on Recognition Memory," Journal of Personality and Social Psychology, 35, 38-48.

Cantor, N., and Mischel, W. (1979), "Prototypes in Person Perception," in Advances in Experimental Social Psychology, Vol. 12, ed. L. Berkowitz, New York: Academic Press, 3-52.

Cantor, N., Mischel, W., and Schwartz, J. (1982), "A Prototype Analysis of Psychological Situations," Cognitive Psychology, 14, 45-77.

Capon, N., and Burke, M. (1980), "Individual, Product Class, and Task-Related Factors in Consumer Information Processing," Journal of Consumer Research, 7, 314-326.

Capon, N., and Davis, R. (1984), "Basic Cognitive Ability Measures as Predictors of Consumer Information Processing Strategies," Journal of Consumer Research, 11, 551-563.

Carlston, D.E. (1980a), "The Recall and Use of Traits and Events in Social Inference Processes," Journal of Experimental Social Psychology, 16, 303-328.

Carroll, J.D. (1972), "Individual Differences and Multidimensional Scaling," in Multidimensional Scaling: Theory and Applications in the Behavioral Sciences, Vol. 1, eds. R.N. Shepard, A.K. Romney and S.B. Nerlove, NJ: Seminar Press.

Cattin, P., and Wittink, D.R. (1976), "A Monte Carlo Study of Metric and Non-Metric Estimation Methods for Multi-Attribute Models," Research Paper No. 341, Graduate School of Business, Stanford University.

Childers, T.L., Heckler, S.E., and Houston, M.J. (forthcoming), "On the Construct Validity of the SOP Scale," Journal of Consumer Research.

Childers, T.L., Houston, M.J., and Heckler, S.W. (1985), "Measurement of Individual Differences in Visual Versus Verbal Information Processing," Journal of Consumer Research, 12, 125-134.

Clark, M., and Isen, A. (1982), "Toward Understanding the Relationship Between Feeling States and Social Behavior," in Cognitive Social Psychology, eds. A. Mastroff and A. Isen, New York: Elsevier/North Holland, 31-35.

Cohen, G. (1979), "Language Comprehension in Old Age," Cognitive Psychology, 11, 412-429.

Cohen, J.B. (1982), "The Role of Affect in Categorization: Toward a Reconsideration of the Concept of Attitude," in Advances in Consumer Research, Vol. 9, ed. A.A. Mitchell, Ann Arbor, MI: Association for Consumer Research, 94-100.

Cohen, J.B. (1983), "Involvement and You: 1000 Great Ideas," in Advances in Consumer Research, Vol. 10, eds. R.P. Bagozzi and A.M. Tybout, Ann Arbor, MI: Association for Consumer Research, 325-328.

Cohen, J.B. (1987), "Attitude, Affect and Consumer Behavior," Working Paper, Centre for Consumer Research, University of Florida, Gainesville, FL 32611.

Cohen, J.B., and Basu, K. (1987), "Alternative Models of Categorization: Toward a Contingent Processing Framework," Journal of Consumer Research, 13, 455-472.

Cohen, J.B., and Ahtola, O.T. (1971), "An Expectancy x Value Analysis of the Relationship Between Consumer Attitudes and Behavior," in Proceedings of the 2nd Annual Conference of the Association for Consumer Research, ed. D.M. Gardner, College Park, MD: Association for Consumer Research.

Cohen, J.B., Miniard, P.W., and Dickson, P.R. (1980), "Information Integration: An Information Processing Perspective," in Advances in Consumer Research, Vol. 7, ed. J.C. Olson, Ann Arbor, MI: Association for Consumer Research, 161-170.

Cooper, L.A. (1976), "Individual Differences in Visual Comparison Processes," Perception and Psychophysics, 19, 433-444.

Cooper, L.A., and Pogdorny, P. (1976), "Mental Transformations and Visual Comparison Processes: Effects of Complexity and Similarity," Journal of Experimental Psychology: Human Perception and Performance, 2, 503-514.

d'Astous, A. (1986), "Nonanalytic Processing in Consumer Evaluation Formation," doctoral dissertation, University of Florida.

Dominowski, R.L. (1974), "How Do People Discover Concepts?," in Theories in Cognitive Psychology: The Loyola Symposium, New York: Wiley, 257-288.

Dreyfus, H.L. (1979), What Computers Can't Do: A Critique of Artificial Reason, New York: Harper & Row.

Elio, R., and Anderson, J.R. (1981), "The Effects of Category Generalizations and Instance Similarity on Schema Abstraction," Journal of Experimental Psychology: Human Learning and Memory, 7, 397-417.

Fazio, R.H. (1986), "How do Attitudes Guide Behavior?," in Handbook of Motivation and Cognition, eds, R.M. Sorrentino and E.T. Higgins, New York: Guilford, 204-234.

Fishbein, M. (1963), "An Investigation of the Relationships Between Beliefs About an Object and the Attitude Toward that Object," Human Relations, 16, 233-240.

Fishbein, M. (1967), "A Behavior Theory Approach to the Relations between Beliefs about an Object and the Attitude Toward the Object," in Readings in Attitude Theory and Measurement, ed. M. Fishbein, New York: John Wiley and Sons, 389-400.

Fishbein, M., and Ajzen, I. (1975), Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research, Reading, MA: Addison-Wesley.

Fiske, S. (1981), "Social Cognition and Affect," in Cognition, Social Behavior and the Environment, ed. J. Harvey, Hillsdale, NJ: Lawrence Erlbaum Associates, 227-264.

Fiske, S.T. (1982), "Schema-Triggered Affect: Application to Social Perception," in Affect and Cognition: The 17th Annual Carnegie Symposium on Cognition, eds. M.S. Clark and S.T. Fiske, Hillsdale, NJ: Erlbaum, 55-78.

Fiske, S.T., and Pavelchak, M.A. (1986), "Category Based vs. Piecemeal-Based Affective Responses: Developments in Schema-Triggered Affect," in Handbook of Motivation and Cognition, eds. R.M. Sorrentino and E.T. Higgins, New York: Guilford, 167-203.

Garner, W.R. (1974), The Processing of Information and Structure, New York: Wiley.

Garner, W.R. (1978), "Aspects of a Stimulus: Features, Dimensions, and Configurations," in Cognition and Categorization, eds. E. Rosch and B.B. Lloyd, Hillsdale, NJ: Erlbaum, 99-133.

Gilovich, T. (1981), "Seeing the Past in the Present: The Effect of Associations to Familiar Events on Judgments and Decisions," Journal of Personality and Social Psychology, 40, 797-808.

Glass, A.L., Holyoak, K.J., and Santa, J.L. (1979), Cognition, Reading, MA: Addison-Wesley.

Glazer, R. (1984), "Multiattribute Perceptual Bias as Revealing of Preference Structure," Journal of Consumer Research, 11, 510-521.

Golden, L.L., and Johnson, K.A. (1983), "The Impact of Sensory Preference and Thinking Versus Feeling Appeals on Advertising Effectiveness," in Advances in Consumer Research, Vol. X, eds. R.P. Bagozzi and A.M. Tybout, San Francisco, Association for Consumer Research.

Green, P.E., and Carmone, F.J. (1970), Multidimensional Scaling and Related Techniques in Marketing Analysis, Boston: Allyn and Baron.

Green, P.E., and DeSarbo, W.S. (1979), "Componential Segmentation in the Analysis of Consumer Trade-Offs," Journal of Marketing, 43, 83-91.

Green, P.E., and Rao, V.R. (1972), Applied Multidimensional Scaling: A Comparison of Approaches and Algorithms, New York: Holt, Rinehart and Winston.

Hamilton, D.L., Katz, L.B., and Leirer, V.O. (1980), "Organizational Processes in Impression Formation," in Person Memory: The Cognitive Basis of Social Perception, eds. R. Hastie, T.M. Ostrom, E.B. Ebbesen, R.S. Wyer, D.L. Hamilton, and D.E. Carlston, Hillsdale, NJ: Erlbaum.

Hampton, J.A. (1979), "Polymorphous Concepts in Semantic Memory," Journal of Verbal Learning and Verbal Behavior, 18, 441-461.

Hansen, F. (1972), Consumer Choice Behavior: A Cognitive Theory, New York: The Free Press.

Harrison, A.F., and Bramson, R.M. (1982), Styles of Thinking, New York: Doubleday.

Hastie, R., and Kumar, P.A. (1979), "Personal Memory: Personality Traits as Organizing Principles in Memory for Behaviors," Journal of Personality and Social Psychology, 37, 25-38.

Hauser, J.R., and Urban, G.L. (1977), "A Normative Method for Modelling Consumer Response to Innovation," Operations Research, 25, 579-619.

Hayes-Roth, B., and Hayes-Roth, F. (1975), "Plasticity in Memorial Networks," Journal of Verbal Learning and Verbal Behavior, 14, 506-522.

Hegelson, J.G., Kluge, E.A., Mager, J., and Taylor, C. (1984), "Trends in Consumer Behavior Literature: A Content Analysis," Journal of Consumer Research, 10, 449-454.

Herr, P.M., Sherman, S.J., and Fazio, R.H. (1983), "On the Consequences of Priming: Assimilation and Contrast Effects," Journal of Experimental Social Psychology, 19, 323-340.

Hintzman, D.L., and Ludlum, G. (1980), "Differential Forgetting of Prototypes and Old Instances: Simulation by an Exemplar-Based Classification Model," Memory and Cognition, 8, 378-382.

Hochberg, J.E. (1978), Perception, Englewood Cliffs, NJ: Prentice-Hall.

Holbrook, M.B., Chestnut, R.B., Oliva, T.A., and Greenleaf, E.A. (1984), "Play as a Consumption Experience: The Role of Emotions, Performance, and Personality in the Enjoyment of Games," Journal of Consumer Research, 11, 728-739.

Holbrook, M.B., and Huber, J. (1979), "Separating Perceptual Dimensions from Affective Overtones: An Application to Consumer Aesthetics," Journal of Consumer Research, 12, 290-297.

Holyoak, K.J., and Glass, A.L. (1975), "The Role of Contradictions and Counter-examples in the Rejection of False Sentences," Journal of Verbal Learning and Verbal Behavior, 14, 215-239.

Holyoak, K.J., and Gordon, P.C. (1984), "Social Reference Points," Journal of Personality and Social Psychology, 46, 510-523.

Homa, D. (1984), "On the Nature of Categories," in The Psychology of Learning and Motivation, Vol. 18, ed. G.H. Bower, New York: Academic Press, 49-94.

Homa, D., Sterling, S., and Trepel, L. (1981), "Limitations of Exemplar-Based Generalization and the Abstraction of Categorical Information," Journal of Experimental Psychology: Human Learning and Memory, 7, 418-439.

Homa, D., and Vosburgh, R. (1976), "Category Breadth and the Abstraction of Prototypical Information," Journal of Experimental Psychology: Human Learning and Memory, 2, 322-330.

Hoyer, W.D. (1984), "An Examination of Consumer Decision Making for a Common Repeat Purchase Product," Journal of Consumer Research, 11, 822-829.

Hutchinson, J.W., and Alba, J.W. (1985), "A Framework for Understanding Consumer Knowledge: I. Structural Aspects and Information Acquisition," working paper, Center for Consumer Research, University of Florida, Gainesville, FL 32611.

Jacoby, L.L., and Brooks, L.R. (1984), "Nonanalytic Cognition: Memory, Perception and Concept Learning," in The Psychology of Learning and Motivation, Vol. 18, ed. G.H. Bower, New York: Academic Press, 1-47.

Johnson, R.H. (1971), "Market Segmentation: A Strategic Management Tool," Journal of Marketing Research, 8, 13-18.

Kahneman, D., and Miller, D.T. (1986), "Norm Theory: Comparing Reality to its Alternatives," Psychological Review, 93, 136-153.

Kahneman, D., Slovik, P, and Tversky, A. (1982), Judgement Under Uncertainty: Heuristics and Biases, Cambridge: Cambridge University Press.

Kassarjian, H.H. (1973), "Field Theory in Consumer Behavior," in Consumer Behavior: Theoretical Sources, eds. S. Ward and T. Robertson, Englewood Cliffs, NJ: Prentice-Hall, 118-140.

Kassarjian, H.H. (1978), "Presidential Address: Anthropomorphism and Parsimony," Advances in Consumer Research, 5, 13-14.

Keedy, H.F. (1978), "The Use of Cognitive, Learning and Teaching Styles to Enhance Learning," ASEE South Eastern Section Meeting Proceedings.

Kellog, R.T. (1980), "Feature Frequency and Hypothesis Testing in the Acquisition of Rule-Governed Concepts," Memory and Cognition, 8, 297-303.

Kemler Nelson, D.G. (1984), "The Effect of Intention on What Concepts are Acquired," Journal of Verbal Learning and Verbal Behavior, 23, 734-759.

Kossan, N.E. (1981), "Developmental Differences in Concept Acquisition Strategies," Child Development, 52, 290-298.

Kosslyn, S.M. (1976), "Can Imagery be Distinguished from Other Forms of Internal Representation? Evidence from Studies of Information Retrieval Time," Memory and Cognition, 4, 291-297.

Kroeber-Riel, W. (1979), "Activation Research: Psychological Approaches in Consumer Research," Journal of Consumer Research, 5, 240-250.

Krueger, L.E. (1973), "Effect of Irrelevant Surrounding Material on Speed of Same-Different Judgment of Two Adjacent Letters," Journal of Experimental Psychology, 98, 252-259.

Krugman, H.E. (1965), "The Impact of Television Advertising: Learning Without Involvement," Public Opinion Quarterly, 39, 349-356.

Lachman, R., Lachman, J., and Butterfield, E.C. (1979), Cognitive Psychology and Information Processing, Hillsdale, NJ: Erlbaum.

Lastovicka, J.L. (1979), "Questioning the Concept of Involvement Defined Product Classes," in Advances in Consumer Research, Vol. 6, ed. W.L. Wilkie, Ann Arbor, MI: Association for Consumer Research, 174-179.

Lazarus, R.S. (1982), "Thoughts on the Relations Between Emotion and Cognition," American Psychologist, 37, 1019-1024.

Levy, S.J. (1959), "Symbols for Sale," Harvard Business Review, 41, 129-140.

Lingle, J.H., Altom, M.W., and Medin, D.L. (1984), "Of Cabbages and Kings: Assessing the Extendibility of Natural Object Concept Models to Social Things," in Handbook of Social Cognition, Vol. 1, eds. R.S. Wyer and T.K. Srull, Hillsdale, NJ: Erlbaum, 71-118.

Lingle, J.H., Dukerich, J.M., and Ostrom, T.M. (1983), "Accessing Information in Memory-Based Impression Judgments: Incongruity vs. Negativity in Retrieval Selectivity," Journal of Personality and Social Psychology.

Lingle, J.H., and Ostrom, T.M. (1979), "Retrieval Selectivity in Memory-Based Impression Judgments," Journal of Personality and Social Psychology, 37, 180-194.

Lockhead, G.R. (1966), "Effects of Dimensional Redundancy on Visual Discrimination," Journal of Experimental Psychology, 72, 95-104.

Lockhead, G.R. (1972), "Processing Dimensional Stimuli: A Note," Psychological Review, 79, 410-419.

Lockhead, G.R. (1979), "Holistic Versus Analytic Process Models: A Reply," Journal of Experimental Psychology: Human Perception and Performance, 5, 746-755.

Lutz, R.J., and Bettman, J.R. (1977), "Multiattribute Models in Marketing: A Bicentennial Review," in Consumer and Industrial Buying Behavior, eds. A.G. Woodside, J.N. Sheth, and P.D. Bennette, New York: North-Holland, 137-149.

Lynch, J.G., and Srull, T.K. (1982), "Memory and Attentional Factors in Consumer Choice: Concepts and Research Methods", Journal of Consumer Research, 9, 18-37.

Lyons, J. (1968), Introduction to Theoretical Linguistics, Cambridge: Cambridge University Press.

Mandler, G. (1975), Mind and Emotion, New York: Wiley.

Mandler, G. (1982), "The Structure of Value: Accounting for Taste," in Affect and Cognition: The 17th Annual Carnegie Symposium on Cognition, eds. M.S. Clark and S.T. Fiske, Hillsdale, NJ: Erlbaum, 3-36.

Markus, H. (1977), "Self-Schemas and Processing Information About the Self," Journal of Personality and Social Psychology, 35, 63-78.

Martin, R.C., and Caramazza, A. (1980), "Classification in Well-Defined and Ill-Defined Categories: Evidence for Common Processing Strategies," Journal of Experimental Psychology: General, 109, 320-353.

Mazis, M.B., Ahtola, O.T., and Klippel, R.E. (1975), "A Comparison of Four Multi-Attribute Models in the Prediction of Consumer Attitudes," Journal of Consumer Research, 2, 38-52.

McAndrews, M.P., and Moscovitch, M. (1985), "Rule-Based and Exemplar-Based Classification in Artificial Grammar Learning," Memory and Cognition, 13, 469-475.

McGuire, W.J., McGuire, C.V., Child, P., and Fujioka, T. (1978), "Salience of Ethnicity in the Spontaneous Self-Concept as a Function of One's Ethnic Distinctiveness in the Social Environment," Journal of Personality and Social Psychology, 36, 511-520.

McGuire, W.J., McGuire, C.V., and Winton, W. (1979), "Effects of Household Sex Composition on the Salience of One's Gender in the Spontaneous Self-Concept," Journal of Experimental Social Psychology, 15, 77-90.

Medin, D.L., Altom, M.W., Edelson, S.M., and Freko, D. (1982), "Correlated Symptoms and Simulated Medical Classification," Journal of Experimental Psychology: Learning, Memory and Cognition, 8, 37-50.

Medin, D.L., and Schaffer, M.M. (1978), "Context Theory of Classification Learning," Psychological Review, 85, 207-238.

Medin, D.L., and Schwanenflugel, P.J. (1981), "Linear Separability in Classification Learning," Journal of Experimental Psychology: Human Learning and Memory, 7, 355-368.

Mervis, C.B., Catlin, J., and Rosch, E. (1976), "Relationships Among Goodness-of Example, Category Norms, and WordFrequency," Bulletin of the Psychonomic Society, 7, 283-284.

Mervis, C.B., and Rosch, E. (1981), "Categorization of Natural Objects," in Annual Review of Psychology, Vol 32, eds. M.P. Rosenzweig and L.W. Porter, Palo Alto, CA: Annual Reviews, Inc., 89-115.

Miller, G.A., and Johnson-Laird, P.N. (1978), Language and Perception, Cambridge, Mass.: Harvard University Press.

Mitchell, A.A., and Olson, J.C. (1977), "Cognitive Effects of Advertising Repetition," in Advances in Consumer Research, Vol. 4, ed. W.D. Perreault Jr., Atlanta: Association for Consumer Research, 213-220.

Mitchell, A.A., and Olson, J.C. (1981), "Are Product Attribute Beliefs the Only Mediator of Advertising Effects on Brand Attitude?," Journal of Marketing Research, 18, 318-332.

Murphy, G.L., and Smith, E.E. (1982), "Basic-Level Superiority in Picture Categorization," Journal of Verbal Learning and Verbal Behavior, 21, 1-20.

Myers, I.B., and Briggs, K.C. (1962), Introduction to Type, Gainesville: Center for Applications of Psychological Type, Inc.

Nedungadi, P., and Hutchinson, J.W. "The Prototypicality of Brands: Relationships with Brand Awareness, Preference and Usage," in Advances in Consumer Research, Vol. 12, E. C. Hirschman and M.B. Holbrook, eds., Washington, D.C., Association for Consumer Research.

Neumann, P.G. (1974), "An Attribute Frequency Model of the Abstraction of Prototypes," Memory and Cognition, 9, 241-248.

Norman, D.A. (1976), Memory and Attention, (2nd ed.), New York: Wiley.

Olson, J.C., and Dover, P.A. (1978), "Cognitive Effects of Deceptive Advertising," Journal of Marketing Research, 15, 29-38.

Ostrom, T.M., Lingle, J.H., Pryor, J.B., and Geva, N. (1980), "Cognitive Organization of Person Impressions," In Person Memory: The Cognitive Basis of Social Perception, eds. R. Hastie, T. Ostrom, E. Ebbesen, R. Wyer, D. Hamilton and D. Carlston, Hillsdale, NJ: Erlbaum.

Parker, B.R., and Srinivasan, V. (1976), "A Consumer Preference Approach to the Planning of Rural Primary Health Care Facilities," Operations Research, 24, 991-1025.

Pessemier, E.A. (1975), "Market Structure Analysis of New Products and Market Opportunities," Journal of Contemporary Business, 35-67.

Pessemier, E.A. (1980), "Store Image and Positioning," Journal of Retailing, 56, 94-106.

Posner, M.I., and Keele, S.W. (1968), "On the Genesis of Abstract Ideas," Journal of Experimental Psychology, 77, 353-363.

Posner, M.I., and Snyder, C.R.R. (1975), "Attention and Cognitive Control," in Information Processing and Cognition: The Loyola Symposium, ed. R.L. Solso, Hillsdale, NJ: Erlbaum, 55-85.

Read, S.J. (1983), "Once is Enough: Causal Reasoning from a Single Instance," Journal of Personality and Social Psychology, 45, 323-334.

Reed, S.K. (1972), "Pattern Recognition and Categorization," Cognitive Psychology, 3, 382-407.

Rips, L.J., Shoben, E.J., and Smith E.E. (1973), "Semantic Distance and the Verification of Semantic Relations," Journal of Verbal Learning and Verbal Behavior, 12, 1-20.

Rosch, E. (1973), "On the Internal Structure of Perceptual and Semantic Categories," in Cognitive Development and the Acquisition of Language, ed. T.E. Moore, New York: Academic Press, 111-144.

Rosch, E. (1975), "Cognitive Representations of Semantic Categories," Journal of Experimental Psychology: General, 104, 192-233.

Rosch, E. (1978), "Principles of Categorization," in Cognition and Categorization, eds. E. Rosch and B.B. Lloyd, Hillsdale, NJ: Erlbaum, 27-48.

Rosch, E., and Mervis, C.B. (1975), "Family Resemblances: Studies in the Internal Structure of Categories," Cognitive Psychology, 7, 573-605.

Rosch, E., Mervis, C.B., Gray, W., Johnson, D., and Boyes-Braem, P. (1976), "Basic Objects in Natural Categories," Cognitive Psychology, 8, 382-439.

Rosenberg, M.J. (1956), "Cognitive Structure and Attitudinal Affect," Journal of Abnormal and Social Psychology, 53, 367-372.

Roth, E. (1980), "Context Effects on the Representation of Meaning," doctoral dissertation, University of Illinois.

Schank, R.C., and Abelson, R.P. (1977), Scripts, Plans, Goals, and Understanding, Hillsdale, NJ: Erlbaum.

Shepard, R.N. (1964), "Attention and the Metric Structure of the Stimulus Space," Journal of Mathematical Psychology, 1, 54-87.

Shocker, A.D., and Srinivasan, V. (1979), "Multiattribute Approaches for Product Concept Evaluation and Generation: A Critical Review," Journal of Marketing Research, 16, 159-180.

Smith, E.E., and Medin, D.L. (1981), Categories and Concepts, Cambridge, MA: Harvard University Press.

Smith, J.D., and Kemler Nelson, D.G. (1984), "Overall Similarity in Adults' Classification: The Child in All of Us," Journal of Experimental Psychology: General, 113, 137-139.

Smith, L.B. (1981), "Importance of the Overall Similarity of Objects for Adults' and Children's Classifications," Journal of Experimental Psychology: Human Perception and Performance, 7, 811-824.

Srull, T.K. (1984), "Methodological Techniques for the Study of Person Memory and Social Cognition," in Handbook of Social Cognition, Vol. 2, eds. J.S. Wyer, Jr. and T.K. Srull, Hillsdale, NJ: Erlbaum, 1-72.

Srull, T.K., and Wyer, R.S., Jr. (1979), "The Role of Category Accessibility in the Interpretation of Information About Persons: Some Determinants and Implications," Journal of Personality and Social Psychology, 37, 1660-1672.

Stefflre, V.J. (1971), "New Products and New Enterprises: A Report of an Experiment in Applied Social Science," Irvine, California.

Sujan, M. (1985), "Consumer Knowledge: Effects on Evaluation Strategies Mediating Consumer Judgments," Journal of Consumer Research, 12, 31-46.

Taylor, S.E., and Crocker, J. (1981), "Schematic Bases of Social Information Processing," in Social Cognition: The Ontario Symposium, Vol. 1, eds. E.T. Higgins, C.P. Herman, and M.P. Zanna, Hillsdale, NJ: Lawrence Erlbaum Associates, 89-133.

Trabarso, T., and Bower, G. (1964), "Memory in Concept Identification," Psychonomic Science, 1, 133-134.

Tsal, Y. (1985), "On the Relationship Between Cognitive and Affective Processes: A Critique of Zajonc and Markus," Journal of Consumer Research, 12, 358-362.

Tolman, E.C. (1955), "Principles of Performance," Psychological Review, 62, 315-326.

Tulving, E. (1972), "Episodic and Semantic Memory," in Organization of Memory, ed. E. Tulving and W. Donaldson, New York: Academic Press.

Tulving, E., and Thomson, D.M. (1973), "Encoding Specificity and Retrieval Processes in Episodic Memory," Psychological Review, 80, 352-373.

Tversky, A. (1977), "Features of Similarity," Psychological Review, 84, 327-352.

Tversky, A., and Gati, I. (1977), "Features of Similarity," Psychological Review, 84, 327-352.

Tversky, A., and Kahneman, D. (1973), "Availability: A Heuristic for Judging Frequency and Availability," Cognitive Psychology, 5, 207-232.

Walker, J.H. (1975), "Real-World Variability, Reasonableness Judgments and Memory Representations for Concepts," Journal of Verbal Learning and Verbal Behavior, 14.

Ward, T.B. (1983), "Response Tempo and Separable-Integral Responding: Evidence for an Integral-to-Separable Processing Sequence in Visual Perception," Journal of Experimental Psychology: Human Perception and Performance, 9, 103-112.

Whitfield, T.W.A., and Slatter, P.E. (1979), "The Effect of Categorization and Prototypicality on Aesthetic Choice in a Furniture Selection Task," British Journal of Psychology, 70, 65-75.

Wilkie, W.L. (1986), Consumer Behavior, New York, John Wiley & Sons.

Wilkie, W.L., and Pessemier, E.A. (1973), "Issues in Marketing's Use of Multiattribute Attitude Models," Journal of Marketing Research, 10, 428-441.

Wright, P.L. (1975), "Consumer Choice Strategies: Simplifying Versus Optimizing," Journal of Marketing Research, 11, 60-67.

Wright, P.L. (1976a), "An Adaptive Consumers' View of Attitudes and Choice Mechanisms as viewed by an Equally Adaptive Advertiser, " in Attitude Research at Bay, ed. W.D. Wells, Chicago: American Marketing Association, 113-311.

Wright, P.L. (176b), "Conditional Consumer Choice Processes and Advertising Strategy: An Introduction to the Principle of Control Via Advocacy and the "mod Squad" for Advertising Strategies," in Attitude Research Moves Ahead, ed. Y. Wind, Chicago: American Marketing Association, 101-106.

Wyer, R.S., Jr., and Carlston, D.E. (1979), Social Cognition, Inference, and Attribution, Hillsdale, NJ: Lawrence Erlbaum Associates.

Wyer, R.S., and Srull, T.K. (1981), "Category Accessibility: Some Theoretical and Empirical Issues Concerning the Processing of Social Stimulus Information," in Social Cognition: The Ontario Symposium, Vol. 1, eds. E.T. Higgins, C.P. Herman and M.P. Zanna, Hillsdale, NJ: Erlbaum, 161-197.

Zajonc, R.B. (1980), "Feeling and Thinking: Preferences Need No Inferences," American Psychologist, 35, 151-175.

Zajonc, R.B., and Markus, H. (1982), "Affective and Cognitive Factors in Preferences," Journal of Consumer Research, 9, 123-131.

BIOGRAPHICAL SKETCH

I was born in Calcutta, India, on the 4th of May, 1956. I went to South Point High School for eleven years and graduated in 1973.

I spent five years at Jadavpur University (Calcutta) and obtained a bachelor's degree in mechanical engineering in 1978. In the same year I travelled to the U.S. and started on a master's program in mechanical engineering at the Florida Institute of Technology. Graduating in 1979, I returned to India.

From 1980 to 1983, I worked in several areas: as an independent filmmaker; as an account executive in an advertising agency; and finally as a Lecturer in the Mechanical Engineering department of Jadavpur University.

In 1983, I started my Ph.D. program in business administration, with concentration on marketing, at the University of Florida.

At present, I am an assistant professor at the Faculty of Management, McGill University.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Joel B. Cohen, Chairman
Professor of Marketing

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

J. Wesley Hutchinson
Associate Professor of Marketing

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Ira Horowitz
Graduate Research Professor of Management and Administrative Sciences

This dissertation was submitted to the Graduate Faculty of the Department of Marketing in the College of Business Administration and to the Graduate School and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

December 1987

Madelyn Lockhart
Dean, Graduate School